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## PHASES OF BRONCHOSCOPY AND ESOPHAGOSCOPY OF IMPORTANCE IN GENERAL PRACTICE

VIRGIL J. SCHWARTZ, M.D.  
Minneapolis, Minnesota

THE DAY has long since passed when the practice of bronchial and esophageal endoscopy consisted only of the removal of foreign bodies from the air and food passages. It has become one of the most important procedures now in use for the examination and treatment of certain chest conditions. True, a major portion of the field is still devoted to the foreign-body problem; but more and more it has been enlarged to include the study and treatment of such conditions as primary carcinoma of the bronchi, malignancy (sarcoma or carcinoma) of the esophagus, lung abscess, tuberculosis, diphtheria, bronchiectasis, and tracheal stenosis or displacement due to thyroid enlargement, mediastinal gland involvement, or aortic aneurysm. Also to be considered are cicatricial stenosis, scleroma, asthma, unexplained vomiting of blood or regurgitation of food, and atelectasis due to thick lung secretions. Any unexplained interference with the function of swallowing, or of the stomach, and unexplained cough, dyspnea, hemoptysis, and expectoration call for appropriate investigation. Furthermore, marked advances in gastroscopy are also being made.

The mechanical problems associated with foreign-body extraction are naturally interesting. A few foreign-body cases which present particular points of interest will be discussed briefly. The esophageal foreign bodies encountered in this series include coins of various kinds (pennies, quarters, nickels, coin slugs), food in large masses, meat bones, pheasant bones, chicken bones, fishbones, open safety pins, straight pins, advertising buttons, wire rings, a thermometer, tin

whistles, a peach stone, buttons, a dental bridge, and so on. Bronchial foreign bodies include nuts of various kinds, diphtheritic casts, a thumbtack, an acorn, a steel screw, fine pieces of carrot, a metal clasp from a dress, a broken portion of an intubation-tube obturator, beads, and others.

Until recently, one of the most tragic situations in the entire field of medicine was our comparative helplessness in the treatment of primary carcinoma of the lung. From a diagnostic standpoint, great advances had been made: a piece of tissue obtained through the bronchoscope settled the diagnosis immediately. Sometimes the patient may have been in splendid condition so far as general operative risk was concerned, and the process may still have been at an early stage of development; yet the danger of operation was so marked that it was generally not advised. In fact, even now a patient who is still in what he considers comparatively good health will not readily entertain the idea of submitting to an operation which has had such a high mortality rate. We have had, therefore, to resort to radium and deep roentgen-ray therapy. The latter had, in fact, given much encouragement. Yet, in general, this treatment is only a palliative measure, as most patients thus treated live considerably less than a year after the diagnosis is made.

Within the past few years, however, marked advances have been made in the surgery of carcinoma of the lungs. Reports of successful lobectomy and pneumonectomy are beginning to appear in the literature, and, if substantial progress continues, it is to be hoped that before long a

reasonably safe procedure will be developed for use in all cases which are not too far advanced.

Mrs. A. P., aged sixty-four, was a typical case. She had complained of shortness of breath for four or five years. A year previously she began to have a dry cough, with a little clear sputum. She noted some blood in the sputum, and expectorated small quantities resembling "cherry-pits"—small, round and sticky. There was no pain, but there was mild dyspnea. The appetite was good; there was no fever nor loss of weight. Anteriorly, on the left side the breath sounds were heard faintly, but the percussion note was almost normal. This is usually the case. Roentgenograms revealed some fluid which was removed. Bronchoscopy and biopsy showed a carcinoma. The patient left the hospital and it was reported that six months later she died.

Mr. W. J., aged sixty-four, was bronchoscoped and a similar condition was found except that instead of presenting a small tumor which only partly filled the bronchial lumen, as in the preceding case, the mass here was so large as to occlude completely the left bronchus.

Carcinoma of the esophagus is an even more discouraging and challenging disease. A common offense in this case is erroneous diagnosis through inferring that the patient's trouble is one of several benign or "nervous" conditions, such as esophageal spasm, cardiospasm, neurasthenia, hysteria, globus hystericus, refusal to swallow, et cetera, instead of doing an early esophagoscopy and giving the patient the benefit of such relief as radium and deep-ray therapy may offer. A still worse offense is the practice of blind bouginage. It is often the immediate cause of death in the presence of an ulcerated, weakened esophageal wall, and is greatly to be condemned, except possibly after esophagoscopy, when the operator is thoroughly familiar with the shape and condition of the particular esophagus in question. Even so, it is a dangerous procedure.

A striking case was Mrs. G. M., who had had increasing difficulty in swallowing for about seven weeks until at the time she was examined she was unable to swallow even liquids. This patient was only twenty-three years old; yet by means of the esophagoscope a carcinoma was found involving the entire circumference of the wall of the upper esophagus and causing almost complete obstruction.

Cancer is found most frequently in the middle

third of the esophagus, somewhat less often at its lower end and least of all in the upper third. Jackson states that strangely enough the most frequent site in women is at the upper end as was the case in the patient just mentioned.

M. K., aged sixty-five, had been unable to swallow solids for weeks and fluids for many days. She was so weak and emaciated that she could not even sit up, yet esophagoscopy was not suggested to her until she came to the clinic. She, too, had a complete ring carcinoma of the upper end of the esophagus.

Another patient, Mrs. C. S., aged thirty-three, had complained of moderate dysphagia for a few weeks. By means of the esophagoscope there was found, in the right pyriform sinus, and extending downward from this for a short distance into the mouth of the esophagus, a sarcoma which was extensively and carefully treated by operation, radium and deep-ray therapy. The patient lived for about eighteen months. All except three of the men and two other women in this series of esophageal cancer showed lesions in the middle or lower third.

In conditions in which tracheal compression, due to goiter, mediastinal glands, tumors, aneurism or other lesions is suspected or evident, tracheoscopy is urgently and sometimes immediately indicated. Unfortunately, this is often delayed until it is too late. The writer received an emergency call to do a tracheotomy upon a patient who was in the operating room, and who was about to have a goiter removed, but became cyanotic on the table. She was found to have a scabbard trachea, which was so markedly compressed on each side by two enormously enlarged thyroid lobes, that it was difficult to understand why she had not suffocated long before. Tracheotomy was done and the patient recovered, but there were some trying moments. Tracheoscopy is easily and quickly done and frequently gives so much information that it should be resorted to much more often. It is frequently possible to tell by the pushed-in appearance of the tracheal wall just which of the two thyroid lobes is enlarged, and to exactly what degree it is encroaching upon the tracheal lumen. It is a well known fact that a patient may go for a long time with slowly increasing tracheal compression and not show any symptoms until sudden dyspnea and cyanosis set in.

Unexplained vomiting of blood in the pres-

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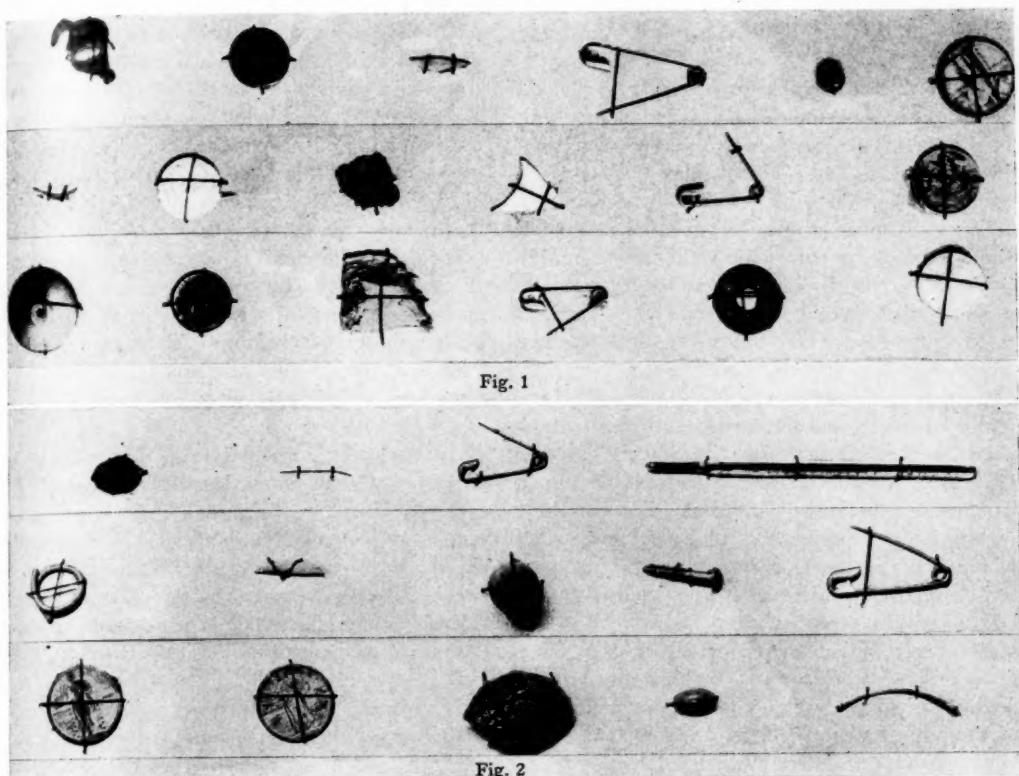


Fig. 1

Fig. 2

Fig. 1. First row: Dental bridge, penny, bone, open safety pin, head in bronchus, quarter. Second row: Fish bone in root of tongue, advertising button, meat bone, chicken bone, open safety pin, nickel. Third row: Tin whistle, penny, meat bone, open safety pin, coin machine slug, nickel. In all illustrations, unless otherwise indicated, foreign bodies were removed from the esophagus.

Fig. 2. First row: Acorn in trachea, steel wire, safety pin, thermometer. Second row: Wire ring, chicken bone, thumb tack in bronchus, steel screw in bronchus, safety pin. Third row: Quarter, quarter, peach stone, bead in bronchus, pheasant bone.

ence of a normal stomach, normal chest findings and a normal nose and throat may be due to a simple esophageal erosion or benign ulceration. Mrs. M. S., aged fifty, had vomited about 1,200 c.c. of bright blood two weeks previous to her admission. It was impossible to find the source of this bleeding, so esophagoscopy was done and an ulcer was found on the posterior wall of the esophagus, thirty-one centimeters from the teeth, possibly due to food or bone trauma. This was cauterized and she has had no bleeding since that time. This type of bleeding is occasionally due to a small dilated vessel, usually a small varicosity, but while these are common in the hypopharynx and on the posterior surface of the root of the tongue, they are comparatively infrequent in the esophagus itself.

Grim as is the aspect in the matter of malignancy, it is exceedingly bright in the foreign body field. In this connection there are some points which warrant mention. First of all, it cannot be too strongly emphasized that the blind insertion of a finger, whether by a doctor or a layman, into the throat for the purpose of pushing down a foreign body is often a disastrous procedure. It is very rare that the finger can actually hook itself around a foreign body, and if the attendant states that he can "feel" it with the finger tip, it is possible that he himself may have pushed it down into an incarcerated position. The old saw that nothing smaller than an elbow should be put into an ear by one not qualified, applies almost equally well to the throat. The only thing that should be used for the re-

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removal of a foreign body in the throat is a pair of forceps, of one kind or another, and under inspection.

The writer was called to see Mrs. C. S., who complained of sudden dyspnea and severe pain in the throat, evidently due to a bone which had just become lodged. The patient was carefully examined with the mirror and no bone was seen, so an x-ray plate was taken and that seemed to show nothing wrong within the photographed field. The only finding of any importance was a small, flat swelling, seen with the laryngeal mirror in the posterior wall of the hypopharynx which could easily have been due to trauma. However, the patient was observed closely and told to report immediately if she felt anything sharp in her throat. On the fourth day she phoned and reported such a sensation, and upon looking into the lower part of the pharynx there was found a bone protruding from the swelling which had previously been noticed on the posterior wall. She then stated that when she first had a choking sensation, her excited son-in-law put his finger in her throat and feeling something there pushed it down hard. In this case he evidently pushed it through the mucous membrane of the posterior wall, but he could just as easily have pushed it into the anterior or lateral wall, in which case the result might have been fatal.

A. R., a year and a half old infant, had a coin slug in his throat which was forced down by a parent so that it was firmly embedded in the upper end of the esophagus. It was removed by esophagoscopy, but this procedure should not have been necessary because it could undoubtedly have been removed with a pair of simple forceps from the pharynx. In another instance a doctor pushed a piece of bone, loose in his own hypopharynx, down into his esophagus, inflicting severe trauma.

Grasping a child by the feet and holding him upside down while trying to have him cough out a foreign body may also be a fatal mistake. This happened in the case of M. N., a child of three. He was brought into the hospital after having stopped breathing about seven or eight minutes before. Tracheotomy was done immediately and an acorn was found firmly wedged in the subglottic space and between the vocal cords. It was impossible to restore breathing. The child had told his parents that he had inhaled an acorn. This had doubtless lodged in the upper part of

one of the main bronchi, and had left him only one lung for breathing, but the parents immediately turned him upside down and forced him to cough, whereupon the acorn fell into the trachea and lodged in the subglottic space, causing spasm of the glottis, a completely blocked trachea, and suffocation.

In view of the common practice of leaving thermometers in the mouths of patients, it is surprising that these do not more frequently enter the esophagus or bronchi. The writer had the unique experience of removing intact a thermometer from the esophagus of M. A., a man with bulbar paralysis. This case was recently reported elsewhere as being the first, or among the first, of its kind on record.

An unusual case was that of H. T., aged seventy-one, who swallowed some food which became stuck in his esophagus. Upon entering the esophagus we found in about its middle third the major part of an entire peach, including the stone. This was removed by the exercise of considerably more pull than is usually applied, yet the patient apparently suffered no ill effect from his experience.

Some foreign bodies are not actually so large, but when the esophagus contains, for instance, a lye-burn stricture, certain foreign bodies are caught which might otherwise pass through. This was the case with G. G., aged 9. He swallowed some lye when a year and a half old and the resulting stricture had been repeatedly dilated since. On January 1, 1932, he swallowed a prune stone which stuck in the esophagus, but was removed without difficulty. In the absence of the stricture the stone would have gone through easily.

A distressing condition with which bronchoscopists have to deal is laryngeal and tracheal diphtheria. It is astonishing to see how frequently children, and occasionally adults, are allowed to go without antitoxin, either through neglect or through failure to make a diagnosis. The patient may be brought into the hospital moribund or so dyspneic and cyanotic that life is a matter of only a few minutes. In such cases immediate laryngoscopy and tracheoscopy, with removal of the obstructing membrane by suction or forceps, will very frequently accomplish what any other method will not. In some cases intubation is indicated, while in others even tracheotomy may fail because often the membrane or diphtheritic

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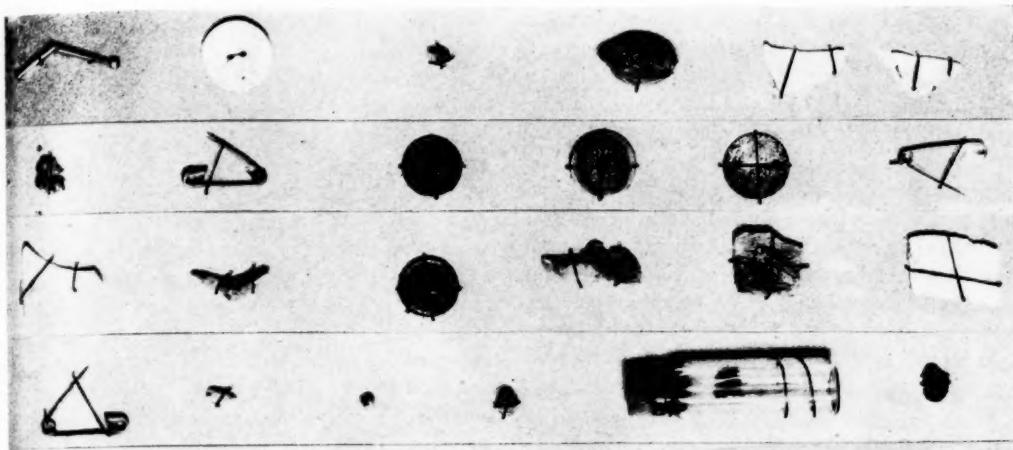


Fig. 3

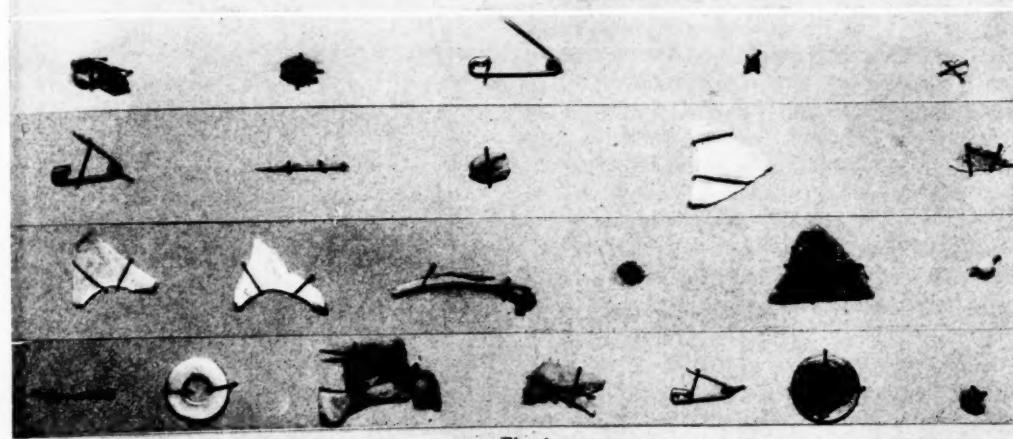


Fig. 4

Fig. 3. First row: Part of intubation obturator in left bronchus, button, peanut in bronchus, prune pit, chicken bone, chick-en bone.

Second row: Peanut in bronchus, safety pin, penny, zinc plate from battery, tin disc, open safety pin (in infant aged two months).

Third row: Chicken bone, meat bone, penny, meat bone, meat bone, meat bone.

Fourth row: Safety pin, concretion from mouth, bead from ear, cork from nose, piece of carrot in left bronchus (mounted in vial), stone in right bronchus.

Fig. 4. First row: Pistachio nut shell in bronchus, peanut in bronchus, safety pin, peanut in bronchus, egg-shell in trachea.

Second row: Safety pin, straight pin, watermelon seed in bronchus, chicken bone, meat bone.

Third row: Chicken bone, chicken bone, chicken bone, sand-burr in left ventricle of larynx, meat bone, glass bead in left ear.

Fourth row: Pin in larynx, aluminum washer, chicken bone, chicken bone, safety pin in esophagus (open end foremost), nickel, peanut in bronchus.

cast extends downward into the main bronchi. G. K., aged 17, was brought into the hospital fighting so hard for breath that a fatal issue seemed unavoidable. This patient had been sick for about twelve days with gradually increasing dyspnea, yet no medical attention was sought. Through a tracheoscope a long diphtheritic cast was removed by suction. The patient's breathing immediately became easier and she eventually recovered. There was, of course, a great amount

of edema of the laryngeal and tracheal mucosa, but this gradually subsided. This procedure is a well established practice in contagious hospitals, and deservedly so.

It must be borne in mind that many things may happen between the time that the x-ray plate is taken in any case of suspected foreign body, and the time of bronchoscopy. A. N., aged four, was brought into the hospital and the x-ray showed a thumb tack in the right main bronchus.

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Within a half hour the thumb tack was found on bronchoscopy in the left main bronchus instead of the right. In other words, while lying on his left side, he had coughed the tack up into the trachea and promptly aspirated it into the left main bronchus.

Similarly J. L., aged eleven months, had definite x-ray evidence of a small dress clasp, such as is used in women's dresses, in his right main bronchus. At bronchoscopy within fifteen minutes nothing was found in the bronchial tree and a second x-ray showed it lodged in his stomach, it having been coughed up and swallowed.

A more interesting case is that of R. G., aged four. X-ray showed definitely a long bead in the right main bronchus. Within a few minutes she was on the operating table and while the instruments were being prepared she suddenly became cyanotic. We suspected the probable cause of her trouble and changed her position a little, with the result that her color improved at once. Within two or three minutes, however, her color again became bad, but by this time the bronchoscope was ready for introduction and the bead was removed from the trachea. It had been coughed from the right main bronchus up into the trachea, and so long as the lumen of the bead was in the long axis of the trachea she was able to breathe through the hole, but when the bead tilted to one side or the other, the air was shut off and the patient became cyanotic.

An unusual accident occurred during the insertion of an intubation tube in a case of laryngeal diphtheria. F. M., aged four, was deeply cyanotic, and upon attempting intubation the attendant was unpleasantly surprised to find that he was not able to insert the tube and that the distal portion of the metal obturator was missing. An x-ray plate was immediately taken and showed this piece to have been broken off and lodged in the bronchus to the left upper lobe. The foreign body was removed and the intubation then proceeded without trouble.

M. B., an infant of twenty months, was admitted with a clinical diagnosis of peanut in the right lung. The child experienced a severe bronchitis, as was to have been expected, but made a good recovery. The bronchial walls normally dilate during inspiration and collapse during expiration; therefore a piece of nut which lies in the lumen often will admit air during inspiration into the area distal to it, but in expira-

tion the walls collapse and the air is imprisoned, causing emphysema. If the foreign body fills the bronchus completely during both inspiration and expiration, atelectasis results. In passing, it is well to repeat again that children under the age of three or four should not be given nuts to eat, but this injunction is rarely heeded.

A man, aged sixty-two, evidently of low mentality, was found to have an entire esophagus full of food. A great piece of meat and cartilage, measuring approximately 4 to 5 inches in length, 1.5 inches in width and 0.5 inch in thickness was removed. A great degree of traction, perhaps the equivalent of 3 or 4 pounds, was required. Upon removal the mass was found to have been literally strangled at the lower esophageal constriction; a deep groove encircled the mass at its middle, as though a heavy rope had been tied about it. This experience may throw considerable light upon the degree of spasm which the cardiac end of the esophagus may develop, for these constrictions must occur at times in people who do not have a foreign body at this point. From a general diagnostic and therapeutic angle, therefore, this case is important. Some careful work has been done by various investigators on the actual, measured degree of contraction or constriction possible at the lower end of the esophagus. This is often due to diaphragmatic compression.

Another case of peanut in the bronchus is mentioned only to emphasize the great necessity of correlating a very careful history with seemingly insignificant symptoms and physical signs. This six year old child had had a very slight coughing spell four days previously, while eating an ordinary candy bar. When first seen by a doctor she had a slight occasional cough with a few râles. There were no other complaints. Roentgenogram showed an almost normal chest on inspiration, but a slight emphysema of the right middle and lower lobes on expiration. A peanut was found not quite filling the lumen of the right bronchus, below the opening of the bronchus to the upper lobe.

A man, aged fifty-nine, had complained of difficult swallowing for some time, but there were no clinical or roentgenologic findings of any kind. Despite this, we found, on esophagoscopy, a ring of pathologic tissue at the cardiac end which, on biopsy, showed adenocarcinoma. This case again emphasizes the need for endoscopic

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examination when an adequate explanation of persistent symptoms is not possible.

Cases of straight pins and safety pins in the esophagi of infants have been seen rather frequently. An uncommon foreign body, however, was a piece of egg-shell in the trachea which was producing symptoms through irritation and spasm out of all proportion to the size of the foreign body. These symptoms disappeared following removal of the egg-shell. Several cases of watermelon seed in the bronchi have been seen, all in young children three to five years of age.

A boy, aged eight, developed atelectasis and emphysema (in different lobes) following an abdominal operation. Bronchiectasis developed after a time and became very troublesome, but it was interesting to note that an injection of lipiodol yielded so much improvement that the boy was able to go about his customary duties, including attendance at school and work following school hours without any appreciable discomfort. Frequently bronchiectasis can be prevented by repeated aspiration of residual pus in the lungs or bronchial tree, the result of an acute suppurative inflammation in this area.

We do not usually expect to find more than one major foreign body in the same patient. Recently a child was brought in with a foreign body in the esophagus which was of the exact size of a five-cent piece. However, we noted that there was hardly enough shadow cast by this foreign body on the roentgenogram to enable us to call it a coin. At esophagoscopy we found a round, very sharp piece of tin which had been swallowed one month before, and had, in the meantime, produced a great deal of trauma in the esophageal wall. The interesting fact in this case is that the child had at the same time also swallowed an open safety pin which the local

doctor was able to remove from the pharynx without much trouble. He did not suspect the presence of more than one foreign body. The case, therefore, indicates the advisability of an x-ray in all cases of foreign body in the air or food passages.

The foregoing reports are only a few which illustrate some general principles. Space does not permit a consideration of the entire series. However, on the basis of some of the experiences cited, a few important rules may be listed, as follows:

1. Never diagnose "nervous" (so-called) conditions in the esophagus without endoscopic examination, if symptoms persist.
2. Never practice "blind bouginage."
3. Never allow the age of your patient to influence your diagnosis unduly.
4. Never "push down" blindly a foreign body in the throat.
5. Never turn a child upside down to cough out a foreign body.
6. Never leave thermometers in the mouths of unattended children or mental incompetents.

On the other side:

1. Always examine early the bronchi or esophagus if malignancy or foreign body is suspected. The earlier this is done the better.
2. Always repeat roentgenologic examination if a known foreign body cannot be found.
3. Always be prepared for tracheotomy.
4. Always be on guard for non-opaque foreign bodies in the chest.

Bronchoscopy and esophagoscopy are in themselves safe, quickly-performed procedures. Do not fear them. If doctors and the laity can be impressed with the necessity of caution and precaution, as above outlined, it will mean the saving of lives which are even yet unnecessarily sacrificed.

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Did you know that twenty-five million cows are milked daily in the United States and that the output of dairy products is estimated at three and one-third billion dollars annually? That Wisconsin headed the list in 1937 for cash farm income from the sale of milk with \$168,255,000 and Minnesota fourth with \$95,330,000? That Minnesota headed the list for butter production in 1936 with 289,830,000 pounds? That Wisconsin produced in 1936 over half of the 642,551,000

pounds of cheese manufactured in the country, while Minnesota rated far down the list with only 12,643,000 pounds production? That in 1908, Chicago enacted the first compulsory pasteurization law? That New York followed in 1912 and that since that date no milk-borne epidemics have been recorded in that city and it is estimated that yearly several thousand babies are saved there annually from cholera infantum?—From *Milk Facts*, Milk Industry Foundation, July, 1938.

# THE USE OF PEDICLE MUSCLE GRAFTS IN FACILITATING OBLITERATION OF LARGE, CHRONIC, NONTUBERCULOUS, PLEURAL EMPYEMA CAVITIES\*

HOWARD K. GRAY, M.D.

Rochester, Minnesota

THE obvious problem in the treatment of chronic nontuberculous pleural empyema is to obliterate the cavity or cavities as rapidly as possible with the minimum risk and deformity, and to restore to as nearly normal as possible the physiologic activities of the chest. With adequate treatment during the acute or subacute stage, most chronic empyemas can be avoided. Unfortunately, however, many cases are encountered in which inadequate drainage has been instituted and in which a chronic process therefore persists.

As is true of many pathologic conditions of the chest, time is an important factor, for the lesion may have produced widespread general effects and it is a constant source of potential danger. Not the least of such a patient's worries may be financial, and for this as well as for physical reasons, it is important that the period of rehabilitation be terminated as rapidly as possible.

Before resorting to any of the more extensive operative procedures, adequate drainage with appropriate local treatment of the chronic empyema cavity should be instituted. By so doing, the general condition of the patient will be improved, and the cavity may diminish appreciably in size or become completely obliterated. If the cavity is not too large, the "roof" may be removed subsequently in multiple stage operations. That further surgical treatment will be necessary and that extensive "unroofing" is inadvisable in an appreciable number of cases is readily admitted, and it is with special reference to the use of pedicle muscle grafts in facilitating obliteration of such cavities that this paper is primarily concerned.

With the exception of Lilienthal's "major non-collapsing thoracoplasty," most of the procedures advocated for the obliteration of large empyema cavities from within have been characterized by extensive deformity. The chief advantage of a modified decortication operation, such as

was originally described by Fowler and Delorme, is the reinflation of the lung which occurs to a limited extent and in so doing may partially obliterate the cavity and restore a greater degree of vital capacity. Unfortunately, however, the procedure is applicable only in a very limited number of cases because of the frequent association of marked fibrosis in the underlying pulmonary tissue and it cannot be carried out without appreciable risk.

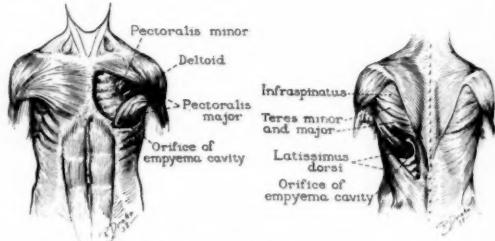


Fig. 1. Showing the accessibility of *a*, the pectoralis major muscle, and *b*, the latissimus dorsi muscle for pedicle muscle grafts in facilitating obliteration of large, chronic nontuberculous pleural empyema cavities.

Similar criticism of the marked deformity and unwarranted risk imposed may be directed at most procedures designed to obliterate the empyema cavity by collapsing the thoracic wall. This can be accomplished only after the bony framework has been removed, whether it be by the radical thoracoplasty of Schede or the many modifications of this procedure in which the soft tissue is preserved.

If obliteration of a large empyema cavity by permitting the lung to expand is impracticable and if by collapsing the wall of the chest too great a risk and deformity are imposed, the only method by which obliteration may be accomplished is to assist the natural healing processes by filling the cavity with some foreign substance. In order to conform to accepted surgical principles, it is essential that this substance be viable. Because of their accessibility, the pectoralis major and the latissimus dorsi muscles are ideally suited for the purpose (Fig. 1).

\*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the meeting of the Minnesota Surgical Society, Minneapolis, Minnesota, May 20, 1938.

## EMPYEMA CAVITIES—GRAY

According to Gray, the latissimus dorsi muscle "arises by tendinous fibers from the spinous processes of the lower six thoracic vertebrae and from the posterior layer of the lumbodorsal fascia (by which it is attached to the spines of the lumbar and sacral vertebrae, to the supraspinal ligament, and to the posterior part of the crest of the ilium)." It is inserted into the bottom of the intertubercular groove of the humerus and receives its blood supply through the subscapular artery, a branch of the axillary artery. Impulses pass to the latissimus dorsi muscle along the sixth, seventh, and eighth cervical nerves through the thoracodorsal (long subscapular) nerve. The pectoralis major muscle arises "from the anterior surface of the sternal half of the clavicle, from half the breadth of the anterior surface of the sternum as low as the attachment of the cartilage of the sixth or seventh rib, from the cartilages of all the true ribs, with the exception, frequently, of the first or seventh or both, and from the aponeurosis of the obliquus externus abdominis." The muscle ends in a flat tendon, which is inserted into the crest of the greater tubercle of the humerus and receives its blood supply chiefly through the thoraco-acromial and lateral thoracic arteries, both of which are branches of the axillary, and through the perforating branches of the intercostal and internal mammary arteries. Impulses pass to the pectoralis major muscle along the medial and lateral thoracic nerves. Through these nerves the muscle is to receive filaments from all the spinal nerves entering into the formation of the brachial plexus.

The origin and insertion of these two muscles make them particularly suitable for pedicle muscle grafts. The base of the pedicle in both instances is preferably the insertion of the muscle, for in preserving the tissues in this region there will be no interference with the nerve and blood supply. Although the origin may be changed by transplanting the bulk of these muscles into some intrathoracic cavity, the major portion of their function will be retained if there is no interference with the points of insertion.

### Report of Cases

**Case 1.**—The first patient, a youth aged seventeen years, registered at the clinic on March 11, 1936. Five weeks previously a diffuse bronchopneumonia had developed on the right; this was complicated by a hemolytic streptococcal empyema. Multiple thorac-

eses were performed between March 11 and April 7, and open drainage was instituted by removing a portion of three ribs in the region of the most dependent portion of the empyema cavity. The capacity of the cavity at this time was approximately 750 c.c. and it



Fig. 2 (Case 1). Showing the line of incision which was made at right angles to the thoracotomy incision in order to mobilize as much as possible the intact portion of the latissimus dorsi muscle.

extended nearly to the apex of the right hemithorax, compressing the lung medially. The patient was dismissed from the hospital on the fourteenth postoperative day and for the next two weeks returned for daily irrigations and dressings. On May 6 (one month after the open operation) the skin flap on the outer portion of the thoracotomy wound was dissected back and a perpendicular incision was made from the outer third of the lower flap in the direction of the fibers of the latissimus dorsi muscle. A pedicle graft of the latissimus dorsi muscle, approximately 20 cm. in length, was dissected free, leaving the pedicle attached above. This was inserted into the empyema cavity and held in place with one suture. Plastic closure of the skin, where it was dissected free, was then made, along the line of the new incision. The capacity of the cavity at this time was approximately 500 c.c. The wound was packed lightly with vaseline gauze. The patient's convalescence was uneventful and he was dismissed from the hospital on the fourth postoperative day (Fig. 2). Final surgical dismissal was granted two weeks later, and the patient was permitted to return home. His local physician continued to irrigate the residual cavity and complete healing occurred within three months after his dismissal.

**Case 2.**—The second patient was another youth, also seventeen, who registered at the clinic on September 2, 1937. In April, 1934, a right pleural empyema had developed following pneumonia. Drainage of the empyema cavity had been instituted (elsewhere) a week later but the wound had continued to drain at intervals in spite of several operations for osteomyelitis

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of the ribs. There had been considerable loss of weight and, since the operation, the patient had noticed definite curvature of the spine. On physical examination the patient appeared to be poorly developed and poorly nourished; he had a moderately sallow

tive day and returned for daily irrigations and dressings.

On October 8 (one month after the open drainage), the patient reentered the hospital for further surgical treatment. A large empyema cavity still persisted which extended medially and upward approximately 15 cm. from the anterior and superior border of the edge of the opening to the cavity. A long, slightly curved, linear incision was made along the fifth rib, and a skin flap over the pectoralis major muscle was reflected as far as the midsternal line. The pectoralis major muscle was then dissected from its points of origin and reflected upward and laterally. Portions of what appeared to be the fourth and fifth ribs anterolaterally were removed with the intervening muscle bundle, and by so doing a window was made in the uppermost part of the empyema cavity. Through this window and also through the lower opening, the thickened visceral pleura was cross-hatched according to the method of Ransohoff. The pectoralis major muscle was then brought through this opening into the empyema cavity and held in place by several sutures to the thickened visceral pleura (Fig. 3). The incision over the pectoralis muscle was then closed tightly. Following this procedure the patient was dismissed from the hospital on the thirteenth postoperative day, final surgical dismissal being granted on November 12, slightly more than a month after the second operation. Following the patient's dismissal the wound was irrigated and dressed by his mother, as the patient lived in a sparsely settled part of one of the western states. In her last letter (dated May, 1938) she said that the cavity would hold only a 5-inch strip of gauze. Her son had attended school all winter and felt well.

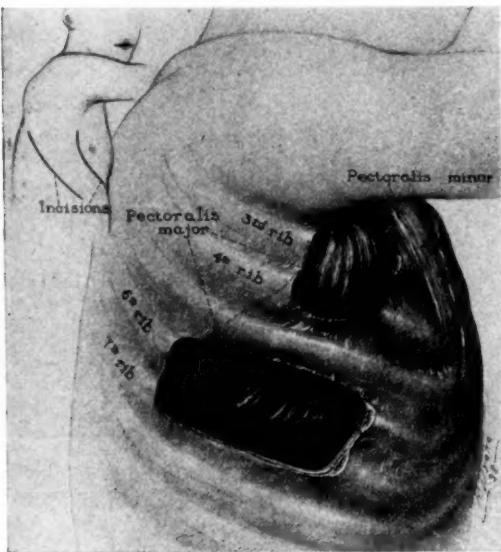


Fig. 3 (Case 2). A window has been made in the thoracic wall near the uppermost portion of the empyema cavity. The pectoralis major muscle has been separated from its origin and the bulk of the muscle has been placed within the cavity through the opening, thus obliterating the apex of the cavity without waste of muscle substance.

complexion. Dulness and diminished breath sounds were noted over this entire right side. A roentgenogram of the thorax revealed a large amount of fluid on the right and evidence that partial resection of the eighth, ninth, and tenth ribs had previously been carried out. Moderate scoliosis was seen in the roentgenograms of the thoracic and lumbar spine.

A needle was inserted in the seventh interspace in the posterior axillary line on the right and a large quantity of thick, yellowish-green pus was found. *Staphylococcus aureus* was cultured from this material.

On September 10 open operation was carried out. After removing a portion of the ninth rib postero-laterally, the empyema cavity was entered. It was found to extend practically from the diaphragm to the apex of the right hemithorax. The lung was compressed medially. The cavity held approximately 1,000 c.c. of thick, yellowish-green pus containing very large clots of fibrin. A portion of what appeared to be regenerated eighth and ninth ribs was removed and also a portion of the tenth rib, leaving an opening into the thoracic cavity approximately 20 cm. in its longest diameter and 12 cm. in width. The cavity was packed lightly with vaseline gauze. The patient was dismissed from the hospital on the thirteenth postopera-

### Comment

These two cases illustrate circumstances in which the use of muscle pedicle grafts are of value in facilitating obliteration of large, chronic, nontuberculous empyema cavities. The procedure is not new, as it was advocated more than twenty years ago by Robinson. As is true of so many worth-while procedures, however, it has gradually fallen into disuse and in recent years has been mentioned only briefly by those interested in this field of surgery. It should not be looked on as a procedure intended to supplant others but rather as one to supplement the surgical armamentarium of those whose responsibility it is to rehabilitate these unfortunate persons as rapidly as possible, and with the minimum deformity and interference with normal function.

### References

1. Gray, Henry: Anatomy of the human body, Ed. 21, New York, Lea and Febiger, 1930, pp. 434-435; 430-432.
2. Robinson, Samuel: The treatment of chronic non-tuberculous empyema. *Surg., Gynec. and Obst.*, 22:557-571, (May) 1916.

## ACUTE UPPER RESPIRATORY INFECTIONS WITH GASTRO-INTESTINAL SYMPTOMS\*

EDWARD DYER ANDERSON, M.D.  
Minneapolis, Minnesota

THE purpose of this paper is to discuss from a strictly clinical standpoint, the gastro-intestinal symptoms which so frequently occur in children with respiratory infections, and in particular the condition which is commonly called "intestinal flu."

It has been known for many years that in children, gastro-intestinal symptoms may be the predominant complaint in various respiratory diseases. In general, the younger the child, the more marked the intestinal symptoms. A child or infant may have anorexia, abdominal pain, vomiting, diarrhea or a combination of these symptoms. They may be mild or severe. A child suffering from an upper respiratory infection ranging in severity from a simple head cold to a lobar pneumonia may show any or all of these gastro-intestinal symptoms.

Whereas in the past, it was assumed that a child showing marked intestinal symptoms had an infection directly involving the gastro-intestinal tract, today we realize that in the majority of instances there is no actual intestinal infection, but rather that the symptoms are brought about by the absorption of toxins from a parenteral infection.

In the most common type of respiratory infection, namely, the simple head cold, the intestinal symptoms vary greatly with the age of the child. In children over two years of age, anorexia is usually the chief and in most instances the only one found. The lack of appetite may be extreme and last for the duration of the cold. If the mother does not force or urge the child to eat more than it wants, the appetite returns when the cold is over and no harm is done. However, if feeding is forced, it may cause a more serious gastro-intestinal disturbance or as so frequently happens, the child may develop a chronic anorexia. I am convinced that many children with persistent poor appetites and poor feeding habits can trace the beginning of their trouble to a simple upper respiratory in-

fection, at which time they were forced and urged to eat when they had no desire for food, by an over-solicitous mother. Their appetite was never allowed to return to normal because of continued forcing of food.

In babies and small children, anorexia is usually a marked symptom accompanying a simple head cold. This is probably due to both absorption of toxins and to the mechanical obstruction of breathing with resultant difficulty in taking food.

Besides anorexia, babies frequently have vomiting, diarrhea and abdominal pain. Allowing the child's appetite to determine the amount of food taken and removing laxative foods from the diet in cases of diarrhea, are usually the only measures needed other than those used for the treatment of the cold. As soon as the cold clears up, the gastro-intestinal symptoms disappear quickly.

In the more severe respiratory infections, such as tonsillitis, grippé, influenza, scarlet fever, measles and pneumonia, the intestinal symptoms are more frequent and 'severe' in all ages of childhood. Abdominal pain is the most frequent symptom. This may vary in intensity from mild abdominal distress to extreme pain which may simulate the pain of appendicitis or even that of intestinal obstruction. The importance of never operating upon a child for appendicitis until one is convinced that the pain is not the result of an upper respiratory infection has been so well and frequently called to our attention by Brennemann and others that I do not feel it necessary to discuss it further in this paper.

I do, however, wish to speak of the opposite phase of this subject. Although much has been written about the danger of operating unnecessarily when the abdominal symptoms are the result of respiratory infections, comparatively little has been said about the great danger of overlooking a surgical abdomen due to a false sense of security when a respiratory infection is present in the patient. When there is evidence of respiratory infection it is very easy for us

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to become careless and miss an acute appendix or obstruction, because we assume the abdominal symptoms are due to the respiratory infection and we either do not examine the abdomen at all, or, if we do so, do it inadequately. In other words, we must constantly remember that just because a cold, sore throat or other respiratory infection is present, it does not rule out the possibility of a surgical condition also being present in the abdomen. This is particularly true when we realize that there is considerable evidence that acute appendicitis may occur as a direct complication of an upper respiratory infection. Also, the fact that intussusception occurs frequently when diarrhea is present should put us constantly on guard against careless diagnosis.

Although many children have been operated upon unnecessarily for abdominal conditions which did not exist, and in whom an upper respiratory infection was the cause of the symptoms which led to a mistaken diagnosis, nevertheless, I am convinced that many more have been allowed to die because either the parents or physician, or both, have been lulled into a feeling of false security because an upper respiratory infection was present, and have neglected to recognize that an acute abdominal condition also existed. Certainly, every child who has persistent abdominal pain should be examined thoroughly and carefully with the possibility of the presence of both an upper respiratory infection and a surgical condition of the abdomen always in mind.

During the last few years a gastro-intestinal condition has been prevalent at various times which is called by the laity and often by ourselves, "intestinal flu." I am sure we all have a peculiar feeling about this term. When a mother tells me that she thinks her child has intestinal flu I unconsciously squirm, and when I use the term myself I consciously squirm. Undoubtedly, this feeling of apology which most of us have when this term is used is due to the fact that we realize that the name is a misnomer, and also that we of the medical profession know so little about the true etiology, bacteriology and pathology of this condition. Perhaps one should hesitate to discuss a disease about which so little can be offered from a purely scientific standpoint. The fact that one meets it so frequently makes me feel that a clinical discussion is war-

ranted. Although intestinal flu is the most commonly used term, many others have been given to this clinical picture, such as, "intestinal cold," "intestinal gripe," "gastro-enteritis," and finally the one which is perhaps the most accurate but certainly too cumbersome for practical purposes, namely, "an upper respiratory infection with gastro-intestinal symptoms."

In this paper I shall use the term "intestinal flu," simply because it is the one most commonly used, and not because I think it is a scientific or good one. Although we do not definitely know what organism is the cause of this symptom syndrome, what evidence we do have would indicate that it definitely is not caused by the influenza bacillus. The term would also imply that the infection is one of the gastro-intestinal tract itself. There is considerable doubt as to whether there is any actual infection of the intestinal tract but rather that the intestinal symptoms are brought about by absorption of toxins from the upper respiratory tract. Many clinicians and pathologists do not think that the condition is a separate entity in itself but rather that it is an ordinary upper respiratory infection. At the present time I do not think we can say positively that it is a separate entity caused by a specific organism, but nevertheless, the symptoms are so definite and often so severe, and the physical findings so uniform, that from a clinical standpoint it does seem an entity. Whatever the name and whatever the etiology, the fact remains that we are dealing with a disease that is common, troublesome to the patient and one which offers problems both in diagnosis and treatment to the physician. Personally, I feel that it probably is due to a virus closely related to that of the ordinary cold. Until the etiology is definitely determined, this symptom-complex will probably continue to be called "intestinal flu" by the laity and by the majority of physicians.

The symptoms of intestinal flu are varied and give us several types of the disease. The most common type is that in which vomiting is the outstanding feature. Although the onset of the vomiting may be preceded by symptoms of a head cold or a mild sore throat, nausea and vomiting are the first and predominant symptoms in the majority of cases. The onset is sudden and the vomiting severe and frequent. Retching continues long after the stomach is

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empty. This retching will often continue for hours and in some instances for two or three days. The taking of any food or fluid usually aggravates the vomiting. Even small sips of water cause immediate emesis. The child becomes markedly exhausted and if the condition persists long enough may develop dehydration and, in severe cases, acidosis. In the majority of instances the children do not complain of sore throat, but they do have severe headache and often have abdominal cramps, which are particularly severe just before vomiting. Extreme restlessness is frequently present and sleep is fitful and broken. Anorexia is invariably present and is usually extreme. Temperature is generally present and may be high but in the majority of cases is low, varying from 100 to 101 (rectal). The white blood count is usually within normal limits or slightly elevated. Physical examination shows a child with a distressed facial expression and with marked pallor. However, if the vomiting has persisted long enough to cause dehydration the skin may appear flushed. The physical finding almost invariably present is the injection of the veins along and about the pillars of the throat. These dilated veins are also on the back of the pharynx but are particularly noticeable about the pillars. When vomiting persists for several hours one usually finds generalized soreness of the abdominal muscles.

In some cases the course of the disease is short and within a few hours the child feels well, wants to play and his appetite returns. In most instances, however, the nausea and vomiting last from twelve to forty-eight hours. After the nausea stops, anorexia and weakness persists for several days and occasionally the child remains languid, tired and has no appetite for several weeks.

### Complications

Acidosis must be watched for and guarded against by the giving of adequate fluids which necessitates at times rectal or subcutaneous administration.

I believe that appendicitis may and does occur in some instances as a direct complication of intestinal flu. In three cases I have seen, I am convinced that acute appendicitis developed on the third or fourth day from the onset. Both because intestinal flu may simulate acute appendicitis and because appendicitis may develop

as a complication, it is imperative that every child with abdominal pain and vomiting should be carefully watched.

Various forms of treatment are advocated in the vomiting type of intestinal flu. Personally, I have found the following the most satisfactory procedure. All food is withheld until the child acts hungry and demands food. Until there has been no vomiting for twenty-four hours the only food given is gelatin, jello, dry toast or soda crackers, dry puffed rice or wheat or unbuttered popcorn. The youngster is also allowed to suck pure stick candy.

When there has been no vomiting for twenty-four hours, broth, soft boiled or poached egg, and cooked cereal are added. If no vomiting occurs for another twenty-four hours, the child is allowed to have his regular diet if he desires. At no time is he urged to eat.

In small infants breast milk or milk mixtures diluted to half of the regular strength are given at the regular feeding intervals if the baby wants food.

When the child cannot retain plain water, the only liquids given by mouth are French Vichy water or ginger ale until there has been no vomiting for twenty-four hours. These are given cool and in small amounts. When there has been no vomiting for twelve hours, plain water is given if the child prefers. Milk is not given until vomiting has ceased for at least forty-eight hours. If there is considerable dehydration or any evidence of threatened acidosis, fluid is given rectally or subcutaneously.

The drug which has been found most useful in combating excessive vomiting is chloral hydrate given by rectum. If given long enough and in dosage sufficient to keep the child quiet and resting for twenty-four hours, in the majority of cases the chloral can be discontinued and the vomiting will not recur if the proper diet is given and no effort is made to force the child to eat. Chloral hydrate per rectum is also very effective in relieving the abdominal pain which is so often present.

There are a considerable number of children suffering from the vomiting type of intestinal flu who get over the acute nausea after two or three days, but who do not seem to completely recover. Their appetite does not come back, and they appear languid and tired. Many of them will have abdominal cramps from time to time.

## UPPER RESPIRATORY INFECTIONS—ANDERSON

This chronic condition may go on for weeks. In these children the giving of acidophilus bacilli in the form of acidophilus milk or as a straight culture will usually quickly restore them to their normal condition. The child is kept in bed until all acute symptoms have subsided. This chronic type so frequently develops as a sequel of the acute form, that I routinely give my patients some form of acidophilus bacilli for a week, starting as soon as the nausea has stopped.

A second type of intestinal flu is that in which diarrhea is the outstanding feature. The diarrhea may vary greatly in severity. The majority of children have frequent stools for from twelve to thirty-six hours, at the end of which time the stools return to normal in a comparatively short time. In some instances the diarrhea may be severe, last for several days and may lead to marked dehydration and even severe acidosis. The stools may vary in number from four to twenty in twenty-four hours. They are watery and have considerable mucus. Blood is rarely seen and, if present, is in the form of small flecks. The stools are usually light in color. They have a foul odor and tend to cause marked excoriation of the buttocks. Cramps are almost invariably present and are severe. Tenesmus is a frequent symptom. Anorexia in most instances is severe. Headache is more common than in the vomiting type. Weakness and restlessness develop in the severe cases. The outstanding physical finding is the same as in the vomiting type, namely, injection of the veins about the pillars of the throat and pharynx. Generalized abdominal soreness is usually present. Temperature may be absent or may be high, but in most instances is from 100 to 102 (rectal).

The treatment I have found most satisfactory is as follows: The child is kept in bed until all acute symptoms have subsided. If nausea is not present, fluids, with the exception of fruit juices, are given by mouth in large amounts. If unable to retain fluids by mouth or if an adequate amount cannot be given to guard against excessive dehydration and acidosis, subcutaneous fluid is given. Food is given if the patient is not

nauseated and wishes to eat. Any simple food is given with the exception of those which are laxative. If chloral hydrate can be retained by rectum it is given to relieve the abdominal cramps. If it cannot be retained and no nausea is present, paregoric by mouth is usually effective. If neither of these can be retained, and the cramps are severe, codeine is given hypodermically. Because of a marked tendency for these children to develop a chronic condition of poor appetite and fatigue following the diarrheal type of intestinal flu, I routinely give them some form of acidophilus bacilli for at least one week. This seems to prevent the occurrence of a prolonged convalescence.

In a considerable percentage of cases of intestinal flu, the patient has both nausea and diarrhea. In these cases the prostration tends to be greater and the danger of acidosis is increased. Subcutaneous fluid often has to be given. The dietary regime is the same as outlined above and codeine by hypodermic may be used to control the restlessness, pain and excessive vomiting. Acidophilus bacilli given by mouth as soon as the nausea stops seems to hasten complete recovery.

Another type of intestinal flu is occasionally seen in which neither vomiting nor diarrhea are present, but in which abdominal cramps, which may be frequent and severe, are the only symptoms. The cramps may persist for many days. The throat findings are the same as previously described. There is usually temperature, and chloral hydrate per rectum is the most effective way of controlling the pain. Acidophilus bacilli given by mouth for several days is of value.

### Summary

Attention is called to the frequency with which gastro-intestinal symptoms occur in children who have respiratory infections. The importance of examining all children having abdominal pain or vomiting, for both respiratory infections and surgical conditions of the abdomen, is emphasized. The symptomatology, physical findings and treatment of the condition called "intestinal flu" are discussed.

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## SOLITARY DIVERTICULITIS OF THE CECUM\*

W. N. GRAVES, A.B., M.D., F.A.C.S.

Duluth, Minnesota

IT is not my intention to discuss diverticulitis of the colon in general but rather to confine my remarks to inflammatory conditions of solitary diverticuli of the cecum, an entity confused with and encountered in the operation for that most common surgical emergency, appendicitis. I have been able to find only twenty-three such cases in the accessible literature, to which I wish to add the accounts of two cases occurring at identical sites on the cecum in two members of one family, a father and daughter.

**Case 1.**—Mrs. R. L. C. was seen on December 29, 1936, complaining of pain in the right lower abdomen. This began two nights before as generalized abdominal pain and became localized the following morning. The pain was dull and intermittent and was aggravated by change of position, walking, etc. There was no nausea or vomiting. For two or more years there had been soreness in the right loin but there had never been any severe attacks. She did notice, however, that the pain was worse on fatigue. Constipation was never a prominent symptom but she had been troubled for some years with "gaseous indigestion." Otherwise her past and family history were irrelevant except that eight years prior to this I operated upon her father for suppurative diverticulitis of the cecum, which case will be included in this report.

Physical examination revealed an adult female aged forty-nine. Findings were limited to a marked tenderness at McBurney's point extending upwards along the crest of the ilium. Muscle spasm was present over this area. No mass could be definitely outlined though there was a suggestion of it above the iliac crest. Vaginal examination was negative except for tenderness high in the right fornix. The temperature was 100 degrees F. Blood examination revealed 20,000 leukocytes. The urine examination was negative.

The pre-operative diagnosis was acute gangrenous appendicitis. Under cyclopropane and ether anesthesia, a right rectus incision was made. Upon opening the peritoneum free fluid was encountered. The appendix was markedly injected and edematous. It was removed in the usual manner and the stump invaginated. On the lateral surface of the cecum, opposite the ileocecal valve, was a severely injected, hard mass about one-half the size of a golf ball, covered with adherent omentum. No dimple could be palpated in this mass and it was thought to be either a phlegmon, diverticulum, or tumor. The attached omentum was ligated and transected and the mass delivered into the wound. There was

marked edema of the greater portion of the cecal wall and because primary excision would have necessitated removing almost all of the anterior and lateral walls, it was entirely extraperitonealized by suture of the visceral and parietal peritoneum. Vaseline gauze was applied and the wound left open. Six days later the mass was removed by means of the endotherm knife. In cutting through edematous serosa and muscularis, the mucosa appeared normal and uninvolved. Therefore, the dissection was carried just outside the mucosa until the center of the mass was reached, when it was found that the mucosa invaginated into the mass. At this time a definite diagnosis of diverticulitis was made. The mucosa was ligated and invaginated with a purse-string suture. The muscularis and serosa were sutured over the stump and the wound closed with drainage. Convalescence was normal except for mild infection of the wound and no fistula resulted.

The pathological report as given by Dr. G. L. Berdez was as follows: "This is a specimen measuring 5.4 by 5 by 3 cm. The external surface is quite congested and shows in places fibrino-purulent deposits. The surface shows also a somewhat irregular opening measuring up to .4 cm. in diameter leading into a diverticulum; the cavity of the diverticulum is almost spherical, measuring up to 1.2 cm. in diameter, and is filled with fecal material and fetid purulent exudate. The internal surface of the diverticulum is lined by mucosa; in the distal extremity the diverticulum shows a small perforation which leads into the surrounding adipose and scar tissue. A large mass of quite edematous and congested adipose tissue, which shows several scar-like areas, is connected with the external wall of the diverticulum and forms the main part of the specimen.

"Microscopically the internal surface of the diverticulum is lined by mucosa having the structure of the mucosa of the large intestine. The lumina of some of the glandular tubules are dilated and filled with polymorphonuclear leukocytes. At one place the mucosa is ulcerated; the defect is lined with a mass of fibrino-leukocytic exudate. The deeper layers of the wall of the diverticulum are formed mainly by a mass of moderately cellular, partly new formed, connective tissue. The muscularis mucosae can still be recognized in those parts of the diverticulum which are still represented in places. At other places of the wall of the diverticulum, the muscular layers cannot be demonstrated.

**"Diagnosis: Diverticulum of the cecum with chronic inflammatory changes and acute exacerbation."**

Gross and microscopic examination was also made of the appendix, which showed marked, diffuse congestion. The proximal half of the lumen contained purulent mucous material and the mucosa was congested and edematous. The distal half was thickened and

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## SOLITARY DIVERTICULITIS OF THE CECUM—GRAVES

fibrous and obliterated by a mass of scar-like fibrous tissue. Dr. Berdez' diagnosis was "chronic appendicitis with acute exacerbation."

Since her recovery, Dr. J. R. McNutt, radiologist, examined the colon fluoroscopically and by radiograms and no other diverticuli or abnormality was found in the entire large bowel.

*Case 2.*—Mr. W. R. S. was seen August 30, 1929, because of pain in the right lower quadrant which had persisted for thirty-six hours. There was no nausea or vomiting. He had many complaints which were not referable to his abdomen but were due to degenerative changes accompanying old age.

Physical examination revealed a white male, aged 69, very obese, and apparently suffering considerable pain. Essential findings were in the right lower quadrant, where there was a marked tenderness and rigidity of all the muscles. There was a suggestion of a mass but it could not be definitely outlined due to the large amount of adipose tissue present. His temperature was 100.8 degrees F.; pulse 100; leukocytes numbered 19,200.

Under spinal anesthesia, with a pre-operative diagnosis of acute appendicitis, the abdomen was opened through a right rectus incision. A mass the size of a baseball was delivered which involved the cecum, appendix and omentum. In the center of this mass was an abscess surrounding an inflamed, perforated diverticulum on the lateral surface of the cecum. The appendix was removed but was intact. Drains were inserted to the site of the diverticulum and also extraperitoneally. Convalescence was marred by development of fecal fistula and other complications incident to his heart and other organs, but he eventually recovered.

The postoperative diagnosis was intra-abdominal abscess due to suppurative diverticulitis. The pathologist reported only fibrous appendicitis.

Unfortunately, there was never a colon study made to prove that this was a solitary diverticulum but none were seen at the time of operation.

In summarizing the twenty-five reported cases, thirteen were in females averaging in age 44.1 years, the most common age incidence in this group being between 45 and 60. Twelve were males averaging 38.1 years in age. The condition occurred most commonly between the ages of twenty and thirty-five. The youngest was a female, aged 3, and the oldest a male, aged 69. The pre-operative diagnosis was acute appendicitis in all cases except one, which from previous barium study was diagnosed carcinoma of the cecum. In analyzing the symptoms of the reported cases, the chief complaint in all the patients was pain in the right lower abdomen of a few hours to a few days duration, accompanied by nausea and vomiting in 50 per cent of the cases. Two of these patients gave histories of almost continuous aching in this region and four

had complained of flatulent dyspepsia for years. The findings common to appendicitis which were noted in this series were: fever varying from 99 to 102 degrees F. in 74 per cent of the cases; rigidity and tenderness, either together or singly, in all but three cases. The average leukocyte count taken in six cases was 18,381, a somewhat higher average than is usually seen in acute appendicitis.

The operations done were as follows:

Primary diverticulectomy.....	9
Delayed diverticulectomy.....	1
Invagination .....	2
Ileocolectomy or cecectomy.....	12
Drainage of abscess.....	1

In the cases in which primary diverticulectomy was done, the condition was recognized as a diverticulum by palpation of a dimple within the bowel, or by noting a concretion, or the mass was assumed to be a small tumor or inflammatory area surrounding an ulcer. The delayed operation was explained in my case above.

In the two cases in which invagination was done, the diverticulum in one was pea sized; the other was three-fourths of an inch in diameter and after extruding a concretion there was little induration present, making invagination the most logical procedure.

The more radical operations of ileocolectomy or cecectomy were done because the condition was mistaken for carcinoma, tuberculosis, tumor or ulcer. The case in which drainage was done has already been explained.

*Mortality:* All patients recovered except that of Portier, in which it was thought pre-operatively that there was a carcinoma of the cecum present and a resection of the right colon was done, the patient dying from gangrene of the gut.

*Comment:* There is much conjecture about the cause of solitary diverticuli of the cecum. Greensfelder and Hiller theorize on the origin as follows: "We should like to suggest another possibility, though a congenital one, as a factor: namely, the retention in some residual form of the appendix, which appears early in embryological life but normally disappears before the true appendix develops." In a study covering 5,385 major operations and 400 adult autopsies, they were able to find four cases of small traumatic diverticuli occurring after purse-string suture during appendectomy.

## COLON DISORDERS—LARSON

One must allow the possibility that solitary diverticuli of the cecum may be congenital in origin rather than acquired, which is the generally accepted opinion. In twenty-three of these twenty-five cases found in the literature no diverticuli were evident in other parts of the colon. According to Bargen, diverticulosis of the colon occurs most commonly between the ages of fifty-five and fifty-nine and rarely under thirty. The average age of this series was 41.2 years with 36 per cent under thirty. He also states that the incidence ratio of diverticulitis of the colon of males to females is 2.75:1. This series shows slightly greater occurrence in the female. All muscle layers were found microscopically in nine of the fourteen above cases in which studies were done, and the appendix was present in all cases. To the reported cases may be added the two here reported with diverticuli occurring opposite the ileocecal valve in two members of the same family, a father and daughter.

### Summary

1. Many solitary diverticuli of the cecum are probably congenital but acquired diverticuli may follow ulcerative processes or surgical trauma.
2. They occur in a much younger age group than does diverticulosis of the colon in general.

3. Solitary diverticulitis of the cecum presents practically the same symptoms and findings as acute appendicitis.

4. The condition should be sought for and when found, invagination or primary diverticulectomy performed if possible.

5. In the presence of marked induration of the cecum delayed extraperitoneal diverticulectomy is a safe and desirable procedure.

6. Suppurative diverticulitis of the cecum may be mistaken for appendiceal abscess.

7. The fact that Bennett-Jones found three cases in one hospital within three months, that Weible was able to report two cases, that I have encountered two cases, leads me to believe that solitary diverticulitis of the cecum is not as rare as a review of the literature would suggest.

### Bibliography

1. Bargen, J. A.: *Diverticulosis and Diverticulitis of Colon*. *Cyclopedia of Medicine*. Revision Service F. A. Davis Company, pp. 109-112, 1937.
2. Bennett-Jones, M. J.: Primary solitary diverticulitis of cecum: Report on 3 cases with review of 17 recorded cases. *Brit. Jour. Surg.*, 25:66, 1937.
3. Epstein, S. E.: *Diverticulitis of the cecum*. *Am. Jour. Surg.*, 22:276, 1933.
4. Greensfelder, L. A., and Hiller, R. L.: *Cecal diverticulosis with special reference to traumatic diverticula*. *Surg., Gyn., and Obst.*, 46:786, 1929.
5. Klages, F.: *Akute Entzündung eines isolierten Blinddardendivertikels unter dem Bilde der Wurmfortsatzentzündung*. *Zentralbl. f. Chir.*, 64:1090-1093, (May) 1937.
6. Portier, M. F.: *Enteroliths and diverticula*. *Surg., Gyn., and Obst.*, 45:185, 1925.
7. Weible, R. E.: *Diverticulitis of the colon*. *Minnesota Medicine*, 20:21, 1937.

## FUNDAMENTALS IN THE SURGICAL TREATMENT OF COLON DISORDERS\*

LAWRENCE M. LARSON, M.D., F.A.C.S.

Clinical Instructor in Surgery, University of Minnesota  
Minneapolis, Minnesota

SURGICAL procedures on the large bowel remain some of the most difficult of all operations in which not only to obtain satisfactory end-results but also to establish a definite standardization of technic to fit all cases. Many factors tend to produce such a condition. In colonic malignancies the concomitance of obstruction, debilitation, cachexia, anemia, and the imminence of infection, peritonitis, and hemorrhage makes any surgical attack on the large bowel an extremely hazardous maneuver. In recent years, following studies of the physiology and pathology of the large intestine, the actual technic of colon surgery has been proved to be of no more importance than the pre-operative and postopera-

tive management these individuals receive. It is with this factor in mind as well as with accurate conception of the anatomy, pathology, and physiology of the lesions that affect the colon that this paper is concerned.

Several points in the anatomy and physiology of the colon are worth of emphasis. When one considers the function of the large bowel it becomes apparent that the organ is distinctly a double one. The proximal half is an absorptive organ and it acts in a manner similar to the small gut. Embryologically this is in keeping with the fact that the proximal half of the colon of the adult, along with that portion of the small bowel distal to the papilla of Vater, is derived from the mid-gut of the fetus. Furthermore, the superior mesenteric artery supplies the proximal

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half of the colon while the inferior mesenteric artery supplies the distal half of the colon. These factors operate to produce a definite bilaterality to the colon which is furthermore reflected on the physiology of the organ. The left or distal half of the large gut has little to do with absorption, a function which is possessed by the right half, but here the bowel is concerned entirely with storage, propulsion, and expulsion of the feces. Evolution of the form and contour of the walls of the colon give further substantiation of this fact, since the proximal colon has thin walls, its lumen is large and movements here are rapid, small, churning ones. In the left side the walls are thick and muscular, the lumen is small and movements are strong, prolonged contractions which propel the contents onward to empty the colon. When disease, such as a malignant growth, attacks this organ there is consequently a difference in the effects which the lesion produces, depending on its location in the bowel. Therefore when we find an individual harboring a carcinoma of the right colon, the symptoms are most likely to be those of disturbance of physiologic equilibrium, resulting in anemia, weakness, loss of weight and so forth, yet accompanied by no visible loss of blood. The exact explanation of this anemia and weakness is not known but it probably is due to a perverted function of the mucous membrane so that abnormal absorption of toxic products in the bowel takes place.

In the left half of the colon, obstruction is the predominant symptom and this symptom results from a combination of three factors. Here the bowel content is hard and relatively incompressible, the majority of carcinomata in this location are the scirrhouous encircling type and consequently obstruction takes place early. Lastly, here movements are strong and prolonged. The symptoms, therefore, are pain, tumefaction, and alternating periods of diarrhea and constipation along with flatulence and borborygmi. Finally one of the phases of complete obstruction takes place. Thus it is seen that the anatomical and physiological differences in the two arms of the large bowel play a part in determining the type and extent of the surgery which one may safely do in various parts of the colon. Probably of no less importance are these differences in making decisions as to details of pre-operative and postoperative management.

First of all it should be emphasized that malignant lesions of the bowel are, in general, slow growing, they metastasize late, and, if obstruction, exhaustion or concomitant disease does not supervene, good results may be expected from removal of the lesion. This fact has been proved by studies in which individuals dying of malignant tumors of the bowel at autopsy show metastases in surprisingly few cases. In fact, of 210 cases so studied, extension or metastases was found in only half of them, and liver metastases in only a third.

Another point of importance to remember is that diagnosis of these lesions is not, in the majority of cases, difficult. The use of the barium enema, especially with the aid of the double contrast method, has resulted in great accuracy as to the type and location of the lesion as well as its size and operability. Roentgen-ray methods along with the use of the proctoscope and sigmoidoscope should render diagnosis possible in most cases. More than half of the carcinomata involving the entire colon can be visualized by direct inspection through the sigmoidoscope or proctoscope, a fact which has been substantiated by necropsy studies of 210 individuals who died of this disease. Thus by simple means, which can be carried out in the office, it is possible to actually visualize a large percentage of these tumors.

In the pre-operative and postoperative management of individuals harboring diseases of the colon, all measures are directed toward producing and maintaining physiologic rest of the bowel so that healing without complications may be facilitated. Pre-operatively, a diet low in residue, emptying of the bowel of gas and fecal content by properly controlled cathartics, cleansing enemas, and final intestinal sedation along with supportive measures intended to improve the patient's general condition, are all intended to have the bowel at the time of the operation empty, collapsed, quiet and clean. Postoperatively, we have routinely employed, to very great advantage, continuous nasal catheter suction siphonage to prevent the entrance of air into the intestinal tract, a procedure which eliminates, to a large extent, any gaseous distention and consequent aggravation of peristalsis. After distention, nausea and vomiting have occurred, they can be relieved by this suction method but ileus is much more easily prevented than relieved. It

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should be kept in mind that the extent of surgical trauma within the peritoneal cavity, the length of anesthesia and the general condition of the patient are other factors which determine the degree of ileus to be expected postoperatively. Morphine in frequent moderate doses has a beneficial effect because of its property of relieving pain, restlessness, thirst and apprehension, as well as its ability to increase intestinal tone. Its tonic effect results in maintainance of the proper absorptive function of the bowel so that toxemia is definitely lessened, since it has been proved that distention of the gut is notably accompanied by absorption of toxic products. Constipation often accompanies the use of morphine and is most likely the result of inhibition of the defecating reflex, accompanied by increase of tone of the sphincters. A compensatory diarrhea frequently develops after withdrawal of morphine and its mechanism is obvious. The most important factor in prevention of intestinal activity is the withholding of food and fluids by mouth. In our opinion, with the act of swallowing, even though it may be only a small amount of water, and especially with the ingestion of any solid food, a peristaltic wave is initiated which usually travels the entire course of the intestinal tract down to the anus. This increased activity is prone to spread any inflammatory process which may be present in the peritoneal cavity. When the propulsive power of the bowel has been regained—as evidenced by motility of gases in the abdomen, gurgling, movements, and so forth—fluids and, later, food may be administered orally. These measures, along with heat to the abdomen, are an excellent stimulus to complete recovery of normal bowel activity.

It is best, in any patient who goes without ingestion of fluids and foods for any length of time, to stimulate flow of saliva, especially from the parotid gland, by use of chewing gum, or the sucking of a lemon. This definitely lessens the incidence of postoperative parotitis. In brief, the less the swallowing, the less the peristaltic activity initiated.

Fluids, combined with saline or glucose, or both, in these cases are best administered through the intravenous route, less satisfactorily by means of hypodermoclysis. Proctoclysis, of course, in any type of colon operation is contraindicated since fluid given by this method can

only be absorbed by being carried into the right colon. This could only be accomplished by reverse peristalsis, which, of course, would delay healing.

The factors mentioned have for their purpose primarily the promotion of local healing in the bowel by quieting peristalsis and increasing the tone of the bowel, but, of course, measures which increase the general resistance and condition of the patient must not be neglected, such as transfusions, large amounts of parenteral fluids, and so forth. In the immediate convalescence of the patient, after four or five days, it is wise to start, very judiciously, the use of clear fluids, then soft foods and finally, as determined by the tolerance of the patient, a diet high in calories and vitamins, but low in residue. As time goes on, the patient will find out for himself the type of food best suited to his needs.

It is thus evident that, because of the bi-functional nature of the large intestine, most diseases, especially those of a surgical nature, should be regarded differently, depending upon the location in the colon of the lesion. This especially is true when one comes to a consideration of problems involved in resections of the colon. In the distal portion of the large gut, it is usually much more dangerous to resect a segment and make a primary anastomosis in one stage than it is to first employ a drainage operation, such as a colostomy or cecostomy, and sidetrack the fecal current. On the other hand, it is relatively safer, in right colon lesions, to do a short-circuiting operation and in addition to resect the diseased area at one sitting, depending, of course, to a large extent, on the general condition of the patient and characteristics of the lesion. The factor of obstruction is rarely encountered when considering the treatment of lesions in the proximal colon. Aside from the question of relieving obstruction in left colon lesions, and of doing graded operations where the general condition of the patient comes into consideration, there still is another factor of which cognizance is not often taken. This is as described as follows.

Peristaltic movements of the distal colon, as well as anatomical conformations of this portion of the gut, are of a distinctly different nature than those of the right colon and small bowel. In the distal large bowel, the thick muscular walls

have for their purpose forceful, strong movements which are distinctly prolonged and are made under considerable tension. In fact, tonus waves here may last as long as ten to fifteen minutes. In addition there are superimposed on these long contractions smaller contractions often lasting one to two minutes. Thus it is evident that, with such prolonged tension on an anastomosis, healing would be very difficult, largely because of the local ischemia which is produced. This is further evidence as to the value of preliminary colostomy (Larson and Bargen). Furthermore, the contents of the left colon are rather hard and incompressible, and this condition, combined with relative fixation of the mesentery, tends to favor pulling apart the suture lines of an anastomosis. The blood supply in this region is not as abundant as it is in the small bowel, another factor tending to retard healing, since any tension on suture lines results in further ischemia of anastomosed margins and gives increased chance for infections to gain headway. Consequently there is a greater possibility of failure of the tissue to heal. If a preliminary drainage has been done, resection of a segment of bowel followed by anastomosis is more liable to heal satisfactorily for several reasons. The first, of course, is the side-tracking of the fecal current and the decompression of the bowel. Secondly, since a certain amount of peristaltic motion of the bowel is due to impulses traveling along the muscular layers, interruptions of these muscular fibers by cutting across the bowel in making a colostomy results in many of these waves being stopped and they cannot jump from the proximal to the distal stoma. This has the effect of keeping the side-tracked loop of gut much more quiet with consequent avoidance of tension on suture lines. It is, of course, true that the latter segment contains no fecal material and that it can be cleansed readily

so that inflammatory reactions may subside and exudates may be absorbed, but the factor of inactivity is, likewise, an important one in successful promotion of healing.

It is true that the mesenteric nerves (sympathetic fibers), which run along the blood vessel, do reach the bowel wall regardless of interruption of continuity of the gut, as demonstrated in a previously published communication (Larson and Bargen). However, the main motor nerve to the colon, the pelvic nerve (or *nervi erigentes*), supplies only the distal portion of the left colon and this nerve plexus lies on the surface of the bowel wall between the muscular layers. Consequently, it is readily understandable why motor impulses through the gut are interrupted by section of the bowel. When reestablishment of the continuity of the bowel is again made, coördination of the intestinal movements is usually resumed in a relatively short time with no particular difficulty, although it is rather common to find some difficulty in bowel habits is experienced for some time. A parallel situation exists in many cases of local pain occurring postoperatively after appendectomy. It is usually true, when recurrent pains are present for a time after removal of the appendix, that adhesions are considered to be the source of this embarrassing discomfort, and this is no doubt possible in many instances. On the other hand, I am convinced that, in many instances, this pain is due to interference with conductivity of nerve impulses through muscle tissue, resulting from the removal of the appendix. This has the effect of temporarily producing stasis in the proximal cecum, or at least an incoördinated motility in this region, so that pain, flatulence and other symptoms result. These symptoms frequently continue for varying lengths of time, until reestablishment of normal motility has been made.

#### Dangers of Protamine Insulins

Reports of reactions following the use of protamine zinc insulin have appeared in considerable number. In one of the earlier discussions of protamine zinc insulin it was reported that hypoglycemia from this type is more subtle in onset and on the whole subjective symptoms are less severe than with soluble insulin. Preliminary symptoms of shakiness, sweating and palpitation may be absent; thus severe hypoglycemic symptoms may appear without warning. Ample evidence is

now available that protamine zinc insulin is not a fool-proof substitute for the older preparation. Although reactions to it seem to appear with less frequency, they also are often characterized by the suddenness of onset, delayed and therefore unexpected appearance, and symptoms precipitated by exercise at such a distant time as also to be wholly unexpected. Although the development of protamine zinc insulin is an advance of unquestioned value to many diabetic patients, the possibilities of delayed severe reactions cannot be ignored. (J.A.M.A., July 16, 1938, p. 254.)

## PRACTICAL PHYSIOLOGY OF THE NOSE\*

HAROLD L. LILLIE, M.D.

Rochester, Minnesota

WHEN it is realized that the nose is the only portion of the body that cannot be appropriately protected from the environment to which it is subjected, it will be appreciated that in order to withstand the exposure to which it is subjected, it must have a wonderfully adaptable functional mechanism. For that reason it is important that fundamentals of the physiology of the nose be known, because in daily practice many patients are encountered who complain of symptoms referable to the upper part of the respiratory tract, which, on final analysis, are not symptoms of pathologic change, but may be explained as evidences of normal physiologic response of the structures to changes in environment.

The details of the function of these structures are not thoroughly understood by many practitioners, and apparently are not known by the laity. This is largely attributable to the fact that, in medical curriculums of the past and present, very little mention is made, and little attention paid, to the part that the upper portion of the respiratory tract plays in respiration and to the effect of this function on the general well-being of the individual. Careful study has been made by research workers on the physiologic processes referable to the special senses, olfaction, taste, and so forth, and, in turn, this knowledge has been passed on to patients. Patients do not understand how the nose and throat would be expected to function under certain environmental conditions, and they, therefore, complain of symptoms which, in reality, are of no more consequence than other physiologic bodily reactions which seem commonplace to them, such as sweating, chilling, sunburning or tanning. Usually, when the symptoms are explained on this basis, the patients are relieved and satisfied.

It is generally considered that the first serious attempt accurately to describe the anatomy and physiology of the nose can be credited to Galen, who lived in the second century A.D. Hippocrates and Aristotle had thought that the reason the nasal interior was moist was that the secre-

tions came from the brain through the cribriform plate of the ethmoid bone. Galen subscribed to this idea. He thought that the nasal membranes were bloodless but he recognized that they were continuous with those of the pharynx and mouth. That the nasal membranes contained secreting glands was not recognized until the time of Schneider. To his credit, Galen said that the function of the nasal interior was to prevent the air from entering the trachea, directly, "First, because the air surrounding us is at times quite cold and the lungs then would be chilled; and, secondly, because small particles of dust or of ashes or anything of this kind may not fall into the trachea."

It was in the sixteenth century that open revolt against the previously accepted ideas of Galen occurred. Among the revolters was Vesalius, a Belgian, who had that attribute of genius described by Carlyle as the ability to see with one's eyes and the inability not to believe what one sees. However, Vesalius, in his observations of the anatomy of the nose and throat, committed more errors than he corrected.

Contemporaneously with Schneider, Willis felt that the fluids in the nose came through the nerves, which he considered to be tubes coming from the brain. Van Ruysch believed that nasal secretions came directly through arterioles and he did not accept the ideas on intermediary effect of glands. Schneider, in the middle of the seventeenth century, wrote voluminously. He showed that secretions in the nose could not come from the brain, through the cribriform plate of the ethmoid bone or lacerated foramina, or through the nerves because they are impervious. He found that mucus could be squeezed out of living or dead membranes but did not mention glands. It was Steno who first described mucous glands. Following introduction of the microscope and discovery of methods of preparing tissue for microscopic study, great strides were made.

Rhinology has made great progress in the past quarter century and, fortunately for patients, is now practiced on a more conservative and scientific basis than before. Formerly it

\*From the Section on Otolaryngology and Rhinology, The Mayo Clinic, Rochester, Minnesota.

was largely practiced on a purely anatomic basis, and, in consequence, many patients underwent very destructive intranasal operations without their symptoms being relieved. This practice led, as Stein<sup>16</sup> said, to adding many new symptoms to the old. In the future, we may look for the application of more physiologic facts and, as experience grows, we may learn to see the patient as a whole rather than through the "hole" of the nasal speculum.

The function of the nose has been said to be fourfold: to warm, to moisten and to filter the inspired air, and to smell. The efficiency of each of these processes depends, largely, on the function of the vasomotor control. The special sense, olfaction, will not be considered.

#### General Fundamental Aspects

Certain individuals can be identified easily by the particular conformation of their noses. In fact, in police work, the nose has been used for this purpose. A well-functioning nose may not necessarily be a thing of beauty but it is a joy forever. It would be difficult to describe the external appearance of the nose in words, and rather difficult to describe its position on the face. All noses of men have one common characteristic: the openings are more nearly on the horizontal than on the vertical plane, when one lives an upright life. There seems to be a natural reason for this, the directing of the air currents into the intranasal structures, or real functioning region. To be sure, a person may live his allotted life breathing through the mouth, but he will not live so comfortably under all environments. Patients are also known to have lived twenty years breathing through a tracheotomy tube.

The indications of the nasal fossa in the embryo appear as pits, situated on either side of the anterior portion of the head, and are first seen at about the twenty-first day, the same time that the eyeball and ear vesicles appear. As development takes place, these nasal pits fuse.<sup>20</sup> Intranasally, the nose is divided by the septum, which is scarcely ever perfectly straight, into nearly equal cavities, opening anteriorly through the vestibule and posteriorly into the pharynx through the choana. From the lateral wall project the three turbinate bones, thereby enlarging the available surface exposure, and helping to direct the air currents within the nose. Beneath each turbinate is situated the so-called

meatus, of which the middle meatus is the most important because in it, protected by the middle turbinate, is situated the hiatus semilunaris, with the openings to the paranasal sinuses. The inferior turbinate is normally the largest and tapers toward each end. Under it is the opening for the lacrimal duct. The intranasal cavity narrows as it approaches its upper extent. That portion of the nose which is below the level of the superior border of the middle turbinate may be said to be respiratory in function, and that above, olfactory. From the choana, the air enters the pharynx.

Histologically, the upper part of the respiratory tract may be said to be lined by the same type of membrane and substructures, except that in certain situations certain characteristics predominate. For instance, the mucosa is relatively thicker over the turbinates than it is in any of the other portions of the tract, and in the ethmoid cells it is relatively very thin. The lining mucous membrane is very vascular and is inseparably united with the periosteum and perichondrium over which it lies.

The blood supply comes largely from the sphenopalatine artery, which anastomoses with the ethmoidal, external nasal, septal and palatine arteries and with those which supply the lower part of the nasolacrimal duct. This network of vessels occupies the deepest regions of the mucosa and the periosteum. The veins empty into the facial veins largely but from the ethmoidal region they communicate with the venous plexus through the cribriform plate. The veins which arise around the lacrimal sac and duct empty into the orbital veins, and into those of the face around the orbit. The lymphatics are subepithelial and large.

The respiratory membrane is supplied with cavernous blood spaces of erectile tissue. The arterioles are supplied with a muscular layer and, from their deep situation, take a corkscrew course toward the surface and the venous sinuses, the latter of which may be of considerable size and so much enlarged in the mucosa, when it is the site of inflammatory change, that it is often difficult to judge what is abnormal. Development of the erectile tissue has a close relationship with the beginning of sexual life, since it is seen in its full extent only after adolescence has been established, and it begins to atrophy after middle life. This fact is of definite clinical importance in everyday practice.

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The capillaries are distributed everywhere through the connective tissue of the mucosa. Tiny capillary twigs are in contact with the basal layer of the glandular epithelium, and Wright<sup>17</sup> has said that it is possible to see direct diapedesis of the leukocytes through the capillary walls and between the gland cells, into the lumina of the acini. There is every reason to believe that in this way the blood vessels may empty the serous and leukocytic elements of the blood directly into the glands. Vasomotor dilatation, therefore, means not only exudation of the serum of the blood vessels into the stroma, and consequent swelling of it, but simultaneously a direct discharge into the glands and onto the surface of the mucosa. Around the ducts of the glands, the mouths of which usually lie in some sulcus of the surface epithelium, there is a more or less thick network of capillaries. It is seen, then, that vasomotor dilatation of these capillaries would mean considerable constriction of the outlets of the glands. As the vasomotor excitement subsides, this constriction is released and free discharge of the content of the seromucous glands is afforded.

The contractile elements of the stroma are composed of elastic tissue and smooth muscle fibers. It will be recalled that attention was drawn to the erectile tissue and to sexual development, and it becomes clinically important that this be recognized, for it accounts for many of the so-called "stuffy noses" so often seen in adolescence and newly married couples. Innervation of these substructures comes from the parasympathetic nerves through the sphenopalatine ganglion and, as knowledge of the sympathetic nervous system and its substructures increases, it will be possible to deal more intelligently with the various syndromes that are attributable to derangement of the vasomotor control. The elastic elements are important because of the effect that repeated inflammatory reactions may have on them. Thick interlacing bundles, running parallel with the planes of the bone, are demonstrable. In the same manner, the smooth muscle cells of the blood vessels are important because of the effect that repeated inflammatory reactions, resulting in enlargements, may have on the caliber and function of the blood vessels.

The sensory nerve supply comes largely from the fifth cranial nerve. The activating nervous

impulses that control what might be called the automatic responses of the nasal membranes, come through two sets of antagonistic autonomic nerves, the vasoconstrictors and the vasodilators. The vasoconstrictor fibers arise from the pre-ganglionic fibers from the central nervous system and the postganglionic fibers from the cells of the sympathetic ganglia. These nerves exert a constant tonic effect. The efferent fibers which cause vasoconstriction are called "pressor" fibers and those that cause vasodilatation are called "depressor" fibers. The vasoconstrictors arise chiefly from the cervical sympathetic nerves. Hempstead<sup>7</sup> has observed marked congestion of the nasal membranes of patients who have been subjected to removal of the cervical ganglia for certain vasospastic conditions of the upper extremities.

It is known that the caliber of the blood vessels is influenced by agents other than the vasoconstrictor and vasodilator fibers. Chemical substances, carbon dioxide, histamine and lactic acid, Bayliss<sup>2</sup> has shown, may produce vasodilatation. Internal secretions, such as epinephrine, may cause vasoconstriction.

Whether the cells of the surface layers of epithelium are of the columnar or of the pavement variety, those of the basal layers, except for the olfactory region, are cuboidal in shape, resembling closely the fixed connective-tissue cells with which they mingle, for there is no limiting membrane between them. It is often difficult to determine where the epithelium leaves off and the stroma begins. In the olfactory region, the epithelium is nonciliated and columnar, and does not possess the glandular elements seen elsewhere. In the respiratory portion, the membrane is covered with columnar, ciliated cells and a mucous film.

In recent years, action of the cilia and movement of the mucous film have received much attention in rhinologic circles. Elucidation of these phenomena has called the attention of observers to the importance of normals and thus has had good effect. However, it can be said, without detracting from the interest of these phenomena, that the action of the cilia is only one phase of the general physiology of the nasal membranes. It has been shown that cilia, fortunately, are present in newly formed membrane following operations. It has been clearly shown by Hilding,<sup>8</sup> Proetz,<sup>12</sup> Yates<sup>19</sup> and others how

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the mucous film and the movement of the cilia perform their function. In the sinuses the cilia have the important function of directing flow toward the ostia. The greatest good has come from exposition of the facts that the normal presence of mucus and the activity of the cilia are great barriers to infection. It is only when this mechanism is deranged that infection gains a foothold.

The Bowman type of gland prevails in the olfactory region. These glands secrete a much less viscid fluid than the racemose glands in the respiratory membrane. Although it may be true that these cells secrete a peculiar fluid which aids in the function of olfaction, its watery character is especially adapted to extend over the olfactory surface and to cause the fluid to drip down as sterile irrigation for the respiratory region below. It is not bactericidal in action.

The racemose glands of the respiratory region differ in no way from the structure of racemose glands elsewhere in the body. Not infrequently the acini are imbedded in the tissue, but, as a rule, they lie more superficially than the cavernous sinuses, varying greatly in their distribution. In the paranasal sinuses there are very few. It is said that the secretion from the respiratory part of the membrane is in itself considerably bactericidal, at least bacteriostatic.

Under normal conditions the secretions of the nose maintain a certain physiochemical composition which fluctuates within a limited range, depending on the demands of physiologic activity. This is an involved subject and the details have no place in a discussion such as this. The secretion is composed of mucin, solids, minerals and an aqueous portion. The mucin originates in the racemose glands and probably acts as a deterrent to the rapid absorption of the serous portion of the secretion; in addition to having a protective influence on the sensitive ciliated cells it has been shown that the mucus has a bacteriostatic effect.

The activity of the secretory mechanism may be observed clinically. If a patient whose nasal interior is apparently normal can be observed over a period of time, at short intervals, it will be noticed that the appearance and relative position of the membrane within the nose changes. At first one nostril may be filled because the membranes are swollen; the surface is smooth and relatively dry. In a moment or two, the sur-

face is seen to be studded with little discrete drops of moisture. Soon the droplets increase in size and the surface begins to be covered with a film. Now it is noticed that the swelling of the membrane is less and gradually becomes much less, so that the membrane does not fill the nostril as it did. The membrane in the opposite nostril, if examined, may be found to be increasing in size. What has happened is that the blood spaces in the membrane have filled; the involuntary muscle, through stimulation of nerves is causing contraction of the blood spaces, forcing the blood into the glands and stroma, and in turn the content of the glands is expelled through the ducts onto the surface, producing the droplet that can be seen. As the activity is increased, the secretion increases until the cycle is completed. The watery, or predominant, portion of the secretion comes from the tubular, Bowman type of gland. This automatic flushing of the surface cannot be imitated by sprays and douches. Denuding of the surface subjects the sensitive epithelium to changes that are not consistent with normal conditions.

It can be observed clinically that nasal respiration is an adaptive reflex mechanism, lessening resistance when respiratory need is increased, and vice versa. Dilatation of the vessels, when it is not carried to the point of rendering insufficient the amount of air supplied to the lungs, renders the air, when it reaches the pharynx, not only warmer, more moist, and more free of dust and bacteria, but by filling the unnecessary space in the respiratory region of the nose, it directs a more copious supply of air toward the olfactory region. Wright and Smith<sup>18</sup> said:

"The internal configuration of every nose, even of those we would pronounce normal, varies so greatly that every nasal chamber is a law to itself. Anterior and posterior rhinoscopy are often incapable of furnishing us with trustworthy information as to the efficiency of the nasal chambers in the performance of these functions. The statements of patients are still more untrustworthy. Some fail to appreciate even extreme grades of nasal obstruction. Others complain of it when manifestly it does not exist. The clinical experience, the common sense of the physician, and his ability to judge the patient's temperament are more important guides to the appreciation of how these functions are in reality being performed, than the help his technical skill or the instruments of precision at his disposal furnish him."

Paget<sup>11</sup> has said that he believed the function of the nose to be to filter the air and that the

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other ascribed functions are entirely subsidiary. He expressed the belief that nearly every healthy man has lost the power to breathe through the nose because of the tendency to alar collapse, that if more respiration was nasal there would be less pulmonary disease.

Chepmell,<sup>4</sup> in discussing Paget's annotation, quoted Catlin's book entitled, "Shut Your Mouth," written in the early forties of the nineteenth century. Catlin was impressed by the healthiness of the American Indian children, whose mothers insisted on their breathing through their noses. Hagemann<sup>5</sup> expressed the belief that the function of the nose may be emunctory to a large extent. Wright has said, "Vasomotor phenomena answer to every demand of physiologic need only so far as the mechanism is undamaged in all its parts. Repeated temporary exaggerations of physiologic response lead gradually to the graver forms of polypoid rhinitis and atrophic states." Thus it is seen that the function of the nose is carried on by virtue of its internal configuration and the mechanism of its mucous membrane. As the air enters the vestibule, it takes an upward course, passes over the superior surface of the inferior turbinate, over both surfaces of the middle turbinate, and enters the pharynx. The membrane of the pharynx is essentially like that of the nose, except that it is not so specialized.

In the pharynx, however, there is lymphoid tissue; such tissue is not encountered in the nose. In passing over these structures, the air currents take up the moisture from the surface, and are thus warmed, moistened, and filtered. In expiration, the air currents are directed largely through the inferior meatus by the posterior tip of the inferior turbinate. What function is served by the accessory sinuses of man is a question, but it is apparent that they are ventilated by the negative pressure effect exerted by the passing streams of air. The function of the tonsillar tissue in the pharynx is also uncertain; that it has a function in early childhood, even though it is not understood or known, I am willing to admit.

Symptoms referable to the upper part of the respiratory tract are less common and are less often complained of when persons live where the climate is warm and equable. This is because there is less necessity for the nose to over-function in order to prepare the air for the lower part of the respiratory tract. Such a

climate, however, has its definite drawbacks, as it has been shown that mental and physical productivity are at lower levels than in less equable environments. Huntington,<sup>6</sup> in his "Civilization and Climate," proved that the output of factory workers increases with change in temperature, and that no other elements of weather seem to have a real influence on such productivity. He explained the physical superiority of persons who live in hard, rugged climates by the subjection of their bodies to frequent and extreme alternations of temperature. The reasonable physiologic explanation of this phenomenon seems to be stimulation of the tonus of the vasomotor system.

Sewall<sup>15</sup> said:

"Climate is the summation of atmospheric conditions as recorded for a long period of time, or, in other words, it is the totality of the weather, while weather is the physical condition of the atmosphere at a given time, or during a limited period.

"It was formerly thought that the atmosphere affected the body only, or chiefly, through the absorption of its elements by the lungs, but it has been found that this is not the case, and that these symptoms are caused by the effects of the atmosphere on the surface of the body. . . . In this connection, the various respiratory membranes are to be thought of as internal body surfaces, which are also brought in direct physical contact with the atmosphere. Heat, humidity, and stillness are the essentials in a bad atmosphere; coolness, dryness, and motion of the air constitute good ventilation."

From what has been described as the normal physiologic reaction of the nose, it can be seen how, with a perfectly acting mechanism, particularly the vasomotor mechanism, the nose would be called on to function in different atmospheres. In the variable, rugged climate of the Northwest, with frequent changes in weather, one might expect that the membrane of the upper part of the respiratory tract would become hypertrophic, whereas, in the warm, equable climate, where the nose is not required to function excessively, there might be very little change. It is easy to understand, then, that in the north, in adolescent and early adult life, many symptoms might arise from the physiologic activity of the respiratory membrane, particularly as it is at this period of life that the function of erectile tissue is at its height. This is why many adolescents and young adults complain of nasal obstruction and excessive secretion. It has been variably estimated that the respiratory membrane might secrete anywhere from a pint to a quart

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(500 to 1,000 c.c.) a day. Patients often complain of obstruction on alternate sides, but as a matter of fact this is normal. Scarcely ever would both sides of the nose be open to the same extent, for the reason that there appears to be a cycle of reaction; that is, while the mucous membrane of one nostril is filling to a point approaching obstruction, the other nostril is opening and throwing off its secretion, and by the time the nostril that is filled has completed its cycle, the other nostril has completed the opposite cycle. The reverse is also true. The cycle may not always take place to the extent described, but nearly to that extent.

At my suggestion, Heetderks<sup>6</sup> made observations on reactions of the nasal membranes of apparently normal persons in each of the first six decades of life, when the persons were subjected to various atmospheric conditions. It was observed that the nasal membranes of adolescents were much more responsive to environmental changes than were the nasal membranes of older persons. In about 80 per cent of cases a definite cycle of activity such as has been alluded to previously, occurred. Also, even though the environmental condition remained the same, a cycle of activity occurred; that is, while the membranes on the turbinates were filling on one side, the membranes on the opposite side were throwing off secretion. Heetderks found that when the subjects were subjected to cold air the secretion was abundant, while in warm air it was less copious and the membrane appeared duller in color.

Patients often complain of obstruction at night on the side on which they are lying. This is the result of passive congestion from gravity and is a normal condition. Complaint is also made of the accumulation of a considerable amount of secretion in the pharynx during the night. Really, the accumulation occurs because it has not been involuntarily disposed of, as it would have been during the day by involuntary swallowing and by eating and drinking. Many persons feel that this condition is detrimental to their health, but I have seen no evidence of this; it is usually the most robust type of patient who makes this kind of complaint. The laity call this condition "catarrh." With the condition of hypertrophic rhinitis superimposed on nasal obstruction caused by anatomic defect, such as a crooked septum, the symptoms are naturally aggravated. In other

words, there is an anatomic obstruction and physiologic hyperactivity. Often, in this type of case, correction of the anatomic obstruction by some operative measure which conserves the membrane, will largely relieve the symptoms. If the symptoms are not relieved in this manner, a change to a high, dry climate often will effect the change by natural processes. The dryness and equability of such a climate will take up the excess secretion that the hypertrophic condition is producing, and there will be little or no variation to cause the excessive physiologic responses. It is in this type of nose that destructive intranasal operations were often performed formerly; these, I believe, are contraindicated.

Occupation has a great deal to do with the physiologic responses of the membrane of the upper part of the respiratory tract. It has been shown that examination of workers in steam laundries, who have been engaged in this type of work a long time, invariably discloses rather definite grades of atrophy of the membrane of the nose. This can be explained on the basis of climatic conditions, already discussed.

Stark<sup>15</sup> made observations on the nasal membranes of patients who were forced to use a tracheotomy tube because of laryngeal obstruction. During the first several days the nasal membrane was congested and the patient had a sense of fullness. After physiologic rest had been established, the congestion disappeared and the membranes were merely moist and duller in color. One patient, who had been troubled by crusting in the nose previous to the use of the tracheotomy tube, was relieved of the crusting after about a week's time. The explanation of this phenomenon must be that because there were no passing air currents to absorb the moisture, the air did not have a drying effect on the mucous constituent of the secretion.

The lumberjack, the farmer, the delivery man, and others who are constantly out-of-doors in all kinds of weather, are not so much troubled with infection of the upper part of the respiratory tract, or with symptoms encountered so often among persons who live a sedentary, indoor life. Attention to personal hygiene will, in some measure, relieve the symptoms. The city dweller has found that he must protect his feet from becoming wet or cold, or have a "cold in the head." "The man clad all day in the same kind of clothing finds that he cannot remove

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on and his type of construction serves the symptoms. In this manner, the effect of dryness will take up little or no space, and that often per-contraction.

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any part of this clothing without the risk of taking cold. His wife wears high shoes or spats during the day, when it is warm, and has her neck and chest protected, but in the evening, attending a social function, she apparently disregards all sane principles of dress; yet it is observed that she is less disposed to catch cold than the man." This is another example of the hardening process. The vasomotor tone is better developed if one exposes the surfaces of his body and changes his clothing to suit the occasion than if one constantly dresses in the same manner. Susceptibility to the physiologic changes can be largely controlled by training; that is, the city dweller can become a farmer or a rural delivery man, and gradually acquire the same physiologic reactions, and the reverse is true.

Much has been written and said recently about the effect of relative humidity and ventilation in the home. At first, attention was given to these matters because of the economic factor; it was noticed that the furniture began to creak and come apart in the winter and that by evaporating water in the rooms this was overcome. In addition, a feeling of greater general physical comfort was obtained at a lower temperature. It has been observed that acute infections of the upper part of the respiratory tract resolved more readily when the temperature was warm and the air moist than when the environment was cold and dry, and that when inhalations of steam were used to saturate the inhaled air with moisture, pharyngeal and laryngeal coughs could be largely controlled. During the cold weather the relative humidity of the air is very low. Sleeping out-of-doors on sleeping porches has been advocated as a health-producing habit, probably because of the wonderful health of those who live out-of-doors and sleep out-of-doors; but it is not taken into account that people in the city live, during at least two-thirds of the day, in a temperature sometimes 100° F. above that to which they might be subjected at night. The change causes too great a physiologic response to be endured by a respiratory membrane not accustomed to such changes.

There is another type of physiologic reaction within the nose which is attributable to some derangement of the sympathetic nervous system, and which results in what is called "vasomotor rhinitis." It may be caused by allergy, endocrine disturbances, avitaminosis or the effect

of severe inflammation, and can sometimes be controlled by removing the causal factor if that factor can be ascertained. If the causal factor cannot be ascertained readily, topical applications to the region of the sphenopalatine ganglion, as shown by Sluder,<sup>14</sup> are beneficial; now ionization is advocated by some observers. Brubaker<sup>3</sup> called attention to the physiology of sneezing. Sneezing may be the manifestation of vasomotor rhinitis. Sneezing is the normal manner of clearing the nose externally. It is customary for the human being, in order to clear the nose, to blow it in some manner, and he usually closes the open nostril and blows against the opposite nostril. It is granted that this method is effective. This creates a strong positive pressure in the nasopharynx, and may produce untoward results, because it may cause the forcible spreading of infections to the ear or paranasal sinuses. Patients often indicate that pain in the ear followed blowing of the nose. Animals are seldom affected because their only method of clearing the nose is by sneezing.

Finally, it can be inferred, from what has been said, that in the daily management of patients it is important that an understanding of the mechanism of the function of the nasal membrane and its reaction to various environmental conditions be common knowledge and that such knowledge be considered of fundamental importance in the practice of rhinology. Only in this way can the variations caused by pathologic conditions be evaluated.

The prime purpose of any form of treatment should be, as nearly as possible, to establish the parts in a condition of "restitutio ad integrum." The patient, in this way, would be relieved of symptoms and would not have to contend with the discomfiture of having had new symptoms added to the old. Conservation of the functional mechanism of the nasal membrane can be effected in many instances if therapeutic measures are applied with this end in view.

### References

1. Barker, L. F.: Environment and its relation to health and disease. Oxford Medicine. New York, Oxford University Press, vol. 1, chap. 19, 1920, pp. 729-738.
2. Bayliss, W. M.: Die Innervation der Gefäße. II. Die Regulation der Blutversorgung. *Ergebn. d. Physiol.*, 5:319-346, 1906.
3. Brubaker, A. P.: The physiology of sneezing. *Jour. Am. Med. Assn.*, 73:585-587, (Aug. 23) 1919.
4. Chepnell, I. D.: The functions of the nose. (Editorial.) *Lancet*, 1:278, (Jan. 24) 1914.
5. Hagemann, J. A.: The upper respiratory mucous membranes as emunctories. *Med. Rec.*, 85:296-297, (Feb. 14) 1914.
6. Heetderks, D. R.: Observations on the reaction of normal nasal mucous membrane. *Am. Jour. Med. Sc.*, 174:231-244 (Aug.) 1927.

## SYNCOPE—HORTON, EATON AND MERIWETHER

7. Hempstead, B. E.: Unpublished data.
8. Hilding, Anderson: The physiology of drainage of nasal mucus. I. The flow of the mucus currents through the drainage-system of the nasal mucosa and its relation to ciliary activity. *Arch. Otol.*, 15:92-100, (Jan.) 1932.
9. Huntington, Ellsworth: Civilization and climate. New Haven, Yale University Press, 1915, 333 pp.
10. McMurrich, J. P.: The development of the human body; a manual of human embryology. Ed. 6. Philadelphia: P. Blakiston's Son and Co., 1920, 501 pp.
11. Paget, O. F.: The functions of the nose. *Lancet*, 1:192-193, (Jan. 17) 1914.
12. Proetz, A. W.: Nasal ciliated epithelium, with special reference to infection and treatment. *Jour. Laryngol. and Otol.*, 49:557-570, (Sept.) 1934.
13. Sewall, Henry: Climate in relation to health and disease. Oxford Medicine. New York, Oxford University Press, vol. 1, chap. 11, 1920, pp. 453-500.
14. Sluder, Greenfield: Concerning some headaches and eye disorders of nasal origin. St. Louis, C. V. Mosby Company, 1918, 272 pp.
15. Stark, W. B.: Unpublished data.
16. Stein, O. J.: The treatment of intranasal and accessory sinus diseases. *Illinois Med. Jour.*, 34:202-204, (Oct.) 1918.
17. Wright, Jonathan: The relation of the biophysical laws of osmosis to nasal vasomotor processes. *New York Med. Jour.*, 94:861-865, (Oct. 28) 1911.
18. Wright, Jonathan, and Smith, Harmon: A textbook of the diseases of the nose and throat. Philadelphia, Lea and Febiger, 1914, 683 pp.
19. Yates, A. L.: Methods of estimating the activity of the ciliary epithelium with the sinuses. *Jour. Laryngol. and Otol.*, 39:554-560, 1924.

## SYNCOPE

BAYARD T. HORTON, M.D.\* L. MCKENDREE EATON, M.D.

and

LODWICK S. MERIWETHER, M.D.

Rochester, Minnesota

SYNCOPE, or fainting, is usually described as a sudden loss of consciousness, which probably is the result of an acute anemia of the brain. However, as to just what happens in these cases, we do not know. In this article, we shall make no attempt to consider all of the possible causes of syncope but rather shall report representative cases of the more common types of syncope in order to make the article of practical value. One could list innumerable causes of syncopal attacks but such a list would serve no useful purpose in this article. We are concerned not only with the patient who has had a transient loss of consciousness and promptly recovers, but also with patients who have had recurring attacks. Usually, the history of the case, if carefully taken, will furnish a definite lead as to the nature of the attack, especially if some relative or friend has observed the patient during an attack and can describe it accurately. The mode of onset and character of the seizure, the presence or absence of an aura, the history of injury during a seizure as well as the concern which the patient himself has with reference to the attack represent important points to be observed in recording the history. Patients almost invariably demand, from the physician, knowledge regarding the nature of their attacks and, particularly, the outlook for the future. It is with these thoughts in mind that the following cases are presented.

### Simple Syncope

*Case 1.*—A man, fifty-eight years of age, was being used as a blood donor for his wife, who had recently undergone an operation. Following the taking of his blood, he became emotionally upset and fell unconscious. He was put to bed and advised to stay in the hospital over night. The next morning he was dismissed; at this time he felt perfectly well.

*Comment on Case 1.*—Fainting is a functional circulatory disturbance which can easily occur if a person has an unstable vasomotor system. As a rule, it is induced by pain or the sight of blood. It is characterized by a feeling of weakness which is followed by some dimness of vision and finally by unconsciousness. The most characteristic feature of such an attack is its slow onset. The patient recovers consciousness in a few minutes and in an hour or so he feels normal.

### Simple Fainting Versus Hypoglycemia

*Case 2.*—A minister, aged forty-eight years, came to the clinic on February 3, 1938, because of the fact that in April, 1937, while he had been brushing his teeth early one morning, he suddenly had lost consciousness and had fallen to the floor; he had struck his chin against the tiles, which had caused a rather severe laceration. He apparently had regained consciousness in ten to fifteen minutes and had felt well enough to walk back to his bed. During the attack of unconsciousness, he had had incontinence of the bowels. He had remained in bed for a week as a matter of precaution, but he had felt perfectly well. He never had had an attack of this sort before or since that time. During the following summer he had worked hard and had not taken his usual vacation. In August, he had begun to note transient periods of

\*Dr. Bayard T. Horton, Division of Medicine, Dr. L. McKendree Eaton, the Section on Neurology, The Mayo Clinic, Rochester, Minnesota, and Dr. Lodwick S. Meriwether, Fellow in Medicine, The Mayo Foundation, Rochester, Minnesota.

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complete exhaustion; these usually had occurred after breakfast and had consisted of a "let-down" or exhausted feeling. This sensation had lasted for ten to fifteen minutes, after which he had felt all right. He never had noted this disturbance before breakfast. These attacks of exhaustion had seemed to increase in frequency when he had been subjected to nervous tension. They had not been associated with physical exertion. In October, 1937, he had had a dizzy spell which had lasted for one and a half hours; during the attack he had felt weak and unsteady but had not had any definite vertigo. It was at this time that he had collapsed completely while he had been attending an important meeting where he was to have given the main address. His address had to be read by one of his assistants. After a day's rest, he had felt entirely normal.

Physical examination at the clinic revealed a powerfully built man who was 6 feet and 3 inches (190.5 cm.) in height and who weighed 225 pounds (112 kg.). He had no excess flesh. At the time he came to the clinic the values for the systolic and diastolic blood pressures were 130 mm. and 80 mm. of mercury respectively while the patient was in the recumbent position. Immediately after he had assumed the standing position the respective values were found to be 110 mm. and 80 mm. On the following day, when he was in the supine position, the respective values were 120 mm. and 84 mm. As soon as he stood up, the respective values were found to be 100 mm. and 80 mm.; after he had stood for one minute, the values were found to be 108 mm. and 80 mm. Routine physical examination and neurologic examination did not reveal any abnormality. The value for the uric acid was 5 mg. per 100 c.c. of blood and that for the sugar was 73 mg. per 100 c.c. of blood. At a previous visit to the clinic, in October, 1935, a diagnosis of gout had been made and since that time he had been following a rather strict regimen because of this condition. In the interval between his first and second visits to the clinic, the values for the uric acid in the blood had been determined at various times; these values always had varied between 6 and 6.4 mg. per 100 c.c. of blood.

**Comment on Case 2.** In this case the patient was primarily concerned with an explanation for the previous loss of consciousness. This was uppermost in his mind and was the reason why he made a hurried visit to the clinic. He had been seen by numerous physicians; practically every one of them had suggested that his attacks were the result of hypoglycemia. However, the value for the blood sugar during his previous attacks of exhaustion always had been 70 mg. or more per 100 c.c. He had noted that the taking of sugar or food had not prevented these attacks of exhaustion and he had not felt better after he had taken food. At the clinic the value for the blood sugar was found to be 73 mg. per

100 c.c. This determination was made at 10:00 a. m., and the patient had not taken any food since 2:00 p. m. the previous day, yet he felt normal at the time the value for the blood sugar was determined. It seems obvious that one can rule out hypoglycemia as the cause of his attack of unconsciousness. In our experience, in cases in which syncopal attacks are the result of hypoglycemia, the value for the blood sugar usually is about 35 to 40 mg. per 100 c.c. during the attacks. The patients almost invariably respond promptly to the ingestion of sugar or food and frequent feedings between meals usually will prevent the attacks. Such had not been this man's experience. The presence of an intracranial lesion has not been ruled out entirely but we are inclined to regard the condition as a simple attack of fainting, which probably was the result of an associated postural hypotension. For this reason we advised the use of ephedrine and benzedrine to see if this would not maintain the blood pressure at a more constant level. However, this patient should again be examined in the course of three to six months to see if there is any additional evidence to suggest an intracranial lesion.

### Carotid Sinus Syndrome

**Case 3.**—A man, aged sixty-two years, registered at the clinic in June, 1937, complaining of rather unusual attacks of "dizziness" which had developed two months previously. Careful questioning disclosed that he had had a similar attack in 1931. For a short time before the patient came to the clinic these attacks had occurred three to four times a week. He described an attack somewhat as follows: Suddenly, without any particular warning, he had noted a dizzy feeling and a sensation as though he were going to fall; he had to steady himself by grasping some supporting object in order to keep from falling. He was not sure whether he had completely lost consciousness or not but he thought that if he had become unconscious it had been for only a moment or two. Most of the attacks had occurred after the patient had assumed an erect posture after he had been in a sitting or recumbent posture for some time. In one of the attacks he had vomited and diarrhea had developed. He had not been aware of the fact that moving the head in one direction or another had precipitated these attacks. He had not had any disturbance of vision or headaches.

Physical examination revealed a man who appeared normal for his age. He weighed 158 pounds (71.7 kg.). The results of general physical examination were essentially negative. The values for the systolic and diastolic blood pressures, while he was in the supine position, were 150 mm. and 85 mm. of mercury, respectively. When he was standing, the value for

the systolic pressure dropped to 130 mm. and that for the diastolic pressure dropped to 80 mm. No abnormal sensations were experienced as a result of this drop in blood pressure. Digital pressure over the right carotid sinus caused the patient to become unconscious immediately. After he regained consciousness he said: "That's the type of attack I've been having." The rate of the radial pulse was markedly decreased and the pulse was almost imperceptible. This man had been a patient at the clinic on two previous occasions. In 1931, a diagnosis of chronic cholecystitis and chronic cholelithiasis had been made. A cholecystectomy had disclosed multiple stones in the gallbladder. He had made an uneventful recovery from that operation. His second admission had been in November, 1936. At this time there had been clinical evidence of periarticular changes in both shoulders; infected tonsils and chronic prostatitis also were discovered. The periarticular arthritis apparently had followed a septic sore throat. At his third, or last, visit there were no arthritic symptoms.

*Comment on Case 3.*—The diagnosis was a hypersensitive carotid sinus reflex on the right side. We are of the opinion that his previous attacks of vertigo and syncope had been due to the hypersensitive carotid sinus. It is interesting to note that digital pressure over the right carotid sinus produced a typical attack, and that the patient said that it corresponded to the spontaneous attacks which he had been having. In view of the fact that the attacks had been present only for two months and that he had not been incapacitated, surgical denervation of the carotid sinus was not advised. The patient was advised to refrain from wearing tight collars and to avoid sudden turning of the head, so as to avoid pressure or strain on the sensitive carotid sinus. Smith and Moersch have pointed out that the effects of medication are not very satisfactory as far as prophylaxis is concerned. Anyone interested in this syndrome should read their reports.

#### Syncope Caused by Hypersensitivity to Cold

Collapse caused by exposure to cold or which occurs while swimming has been observed in a number of instances. Horton has reported a number of cases of this condition. It usually affects subjects who are otherwise healthy. This phenomenon is illustrated by the following case:

*Case 4.*—A man, aged forty-two years, was under observation at the clinic in November, 1935. During the previous year, he had noted urticarial swelling of his hands when they had come in contact with

cold water or cold objects. When he had been out on a cold day, an urticarial rash had developed over the exposed surfaces of the skin. On one occasion, he had collapsed while he had been swimming and had had to be rescued from the water. Physical examination revealed nothing of significance and the routine laboratory tests did not reveal any abnormality. When his left hand was immersed in cold water at 10° C. for five minutes, no swelling of the hand occurred while it was in the water, but approximately three to four minutes after the hand was removed from the water it began to swell, and in ten minutes after it had been taken from the water it was swollen so much that the patient was unable to make a fist. With the swelling of the hand, the patient felt dizzy, but syncope did not actually develop. The blood pressure had decreased from its original level of 118 mm. of mercury for the systolic and 80 mm. for the diastolic to 114 mm. for the systolic and 70 mm. for the diastolic, respectively. This drop in blood pressure was not sufficient to produce symptoms. Shortly after the patient returned home he had a most unusual experience. One morning, when the outside temperature was about 30° F. below zero, he left his home and walked or partially ran a distance of four blocks to catch a bus. After he had got off the bus, a few minutes later, he walked a distance of about one block, when he collapsed and did not regain consciousness until forty minutes later, when he found himself in a hospital with a nurse holding a bottle of medicine for him to inhale. He vomited three or four times. He remained in the hospital one day but did not regain his full strength for about one week. As soon as he regained consciousness, he explained to the attending nurse and later to the physician that his collapse had been due to hypersensitivity to cold. We previously had warned him against undue exposure to cold and, so far as we know, he has never had a similar attack. At one time he had collapsed while he had been swimming, but he had recovered completely in twenty-four hours.

*Comment on Case 4.*—One of us (Horton) previously introduced a test for hypersensitivity to cold, which was employed in this case. The test is as follows: The hand is immersed in ice water at 8° to 10° C., for five minutes. Prior to immersion of the hand in ice water, observations on the blood pressure and pulse rate are made and observations are continued at intervals of one minute while the hand is immersed in the water and for a period of twenty minutes after the hand is removed from the water. If swelling of the hand occurs after it has been removed from the water, the indication is that the patient is hypersensitive to cold. A systemic reaction is indicated by a drop in blood pressure, an increase in the pulse rate, and flushing of the face. We are of the opinion that in all cases in which this systemic reaction occurs,

symptoms of collapse would develop if the patient swam in cold water.

In 1936, one of us (Horton) reported twenty-two cases of hypersensitivity to cold, which represented the total number of such cases previously observed at the clinic. With few exceptions, the patients appeared to be in good health. Hypersensitivity to cold constitutes a grave menace to the unwary swimmer who is the victim of this malady, but the danger can be eliminated by adequate desensitization. In Minnesota alone, since 1920, 3,000 persons have drowned while swimming. One cannot help but wonder if some of these persons were not victims of this condition. Of the twenty-two patients who were hypersensitive to cold, fourteen had systemic reactions and eleven of the fourteen had had attacks of syncope; in nine cases the syncope had occurred while the patients had been swimming and four of the nine patients had to be rescued from the water. More than twenty-four cases in which syncope occurred following swimming have been reported in the literature, and at least nine of these persons had to be rescued from the water. Fortunately, patients who are hypersensitive to cold are amenable to treatment. Systemic desensitization to cold can be accomplished in at least three ways: first, by having the patient immerse the hand in water at 10° C. for from one to two minutes twice a day for three or four weeks; second, by the subcutaneous injection of 0.1 mg. of histamine, or less, twice daily for two to three weeks; and third, by the oral administration of histaminase.

#### Syncope Associated with Postural Hypotension

*Case 5.*—A married woman, aged thirty-three years, came to the clinic in October, 1934, for a general examination. She had symptoms of vague indigestion and said that on various occasions she had fainted, particularly if she had been lying down and had got up suddenly. This had occurred frequently when she had had to get up suddenly to answer the telephone. By the time she had reached the telephone and had said "Hello," she had collapsed on the floor. Consciousness had returned promptly and she had never hurt herself when she had fallen. Physical examination did not reveal any abnormality. Her blood pressure was taken on numerous occasions for a period of ten days, but the values for the blood pressure did not fluctuate to any very marked extent. The systolic and diastolic blood pressures were 103 mm. and 78 mm. of mercury

respectively while the patient was in the horizontal position. As soon as she assumed the erect posture, the values were 100 mm. for the systolic pressure and 70 mm. for the diastolic pressure. Readings of this character were made over a period of ten days, but the greatest drop in the systolic pressure was only 5 mm. and that in the diastolic pressure also was 5 mm. The routine laboratory tests did not reveal any abnormality.

*Comment on Case 5.*—It seems reasonable to assume that the attacks of syncope probably were due to circulatory asthenia and postural hypotension, but we could not demonstrate marked postural changes during the short period of observation. She did not have any attacks of syncope during this period of time. She was advised to return home and to take  $\frac{3}{8}$  grain (0.024 gm.) of ephedrine sulfate two to three times a day if she had additional attacks of syncope. She is unlike the patient in Case 6 as she had had frequent attacks of syncope but there were no demonstrable changes in blood pressure when she changed posture.

*Case 6.*—A woman, aged forty-three years, came to the clinic in March, 1937, because of frequent attacks of dizzy spells which had been recurring at frequent intervals for the past year. These attacks had been precipitated when she suddenly had arisen from a sitting to a standing posture. Attacks of syncope apparently had not been noted, although on many occasions she had felt as though she were going to faint. When she came to the clinic the value for her systolic blood pressure was 130 mm. of mercury and that for the diastolic pressure 85 mm. No record was made as to whether the readings were observed while the patient was in the recumbent or sitting posture. Two days later, the systolic blood pressure was 98 mm. and the diastolic pressure was 60 mm. while she was in the recumbent position. As soon as she assumed the standing position, the systolic blood pressure was 95 mm. and the diastolic pressure was 58 mm. for a few seconds, but the respective pressures gradually dropped within a period of two minutes to 82 mm. and 58 mm. Slight vertigo developed at this point. As a result of the administration of 10 mg. of benzedrine sulfate three to five times a day, all of the symptoms of vertigo disappeared and she was able to walk around without any discomfort. Previous to her admission to the clinic, she had not gone out without an escort for she frequently had become so dizzy that she had been unable to walk. There are a number of features about this case which we cannot adequately explain but we are of the opinion that the attacks of vertigo were due to the low blood pressure and the associated postural hypotension. Routine laboratory studies did not reveal any abnormality. She continued the use of benzedrine and we have heard from her on a number of occasions; she has continued to be free from symptoms.

### Postural Hypotension Associated with Syncope, following Operation

**Case 7.**—A woman, aged forty-four years, came to the clinic in August, 1935, complaining of urinary symptoms which had been present for six to seven years. During this time she had not had any attacks of dizziness or syncope. A cystoscopic examination did not reveal anything of definite significance. The capacity of the bladder was 200 c.c. A moderate cystocele was present. Under anesthesia, the bladder was overdistended to a capacity of 600 c.c.; three days later, she underwent an operation for the repair of the cystocele. After she had recovered from this operation and had been dismissed from the hospital, on more than one occasion when she had arisen suddenly from a sitting to a standing posture, she had collapsed and had fallen to the floor. Each time, she had regained consciousness promptly. It seems reasonable to assume that a postural hypotension developed following the surgical operation and that she promptly recovered from this after she had regained her strength. At no time were we able to demonstrate postural changes in the blood pressure but she did have a relatively low blood pressure following the operation; the average values were 95 mm. of mercury for the systolic pressure and 68 mm. for the diastolic pressure. The transient drop in blood pressure, which accounted for the attacks of syncope no doubt lasted for only a few seconds so that we were never able to obtain readings quickly enough to demonstrate the postural changes. The attacks ceased before she left the clinic and she has not had attacks since that time.

**Comment on Case 7.**—Postural hypotension is not a disease, but an expression of an inadequate vasomotor control of the arterial system, which may be associated with numerous diseases. In the average case, there is always a sharp drop in systolic and diastolic blood pressure, when a patient arises from a recumbent to a standing posture. In addition, in well advanced cases, hypohidrosis or anhidrosis, is usually present. Also, there is a loss of reflex acceleration of the cardiac rate when the patient assumes an erect posture.

Postural changes in the blood pressure are almost invariably noted after extensive sympathectomy, such as that performed by Adson, Craig and Love, at the clinic, for the relief of essential hypertension. These changes always are most marked when patients first get out of bed. They have been described by Adson in numerous articles on the surgical treatment of hypertension.

In the cases which we are reporting the postural changes in the blood pressure were relatively mild and changes in sweating, as well as

the excretion of large volumes of urine at night, were not observed. When one suspects the presence of a postural hypotension, the blood pressure should be taken while the patient is in the recumbent as well as in the standing posture. We recommend that this method of taking the blood pressure should be a routine part of all physical examinations.

### Arteriosclerosis of the Central Nervous System and Hypertension Associated with Dizziness and Syncope

**Case 8.**—A woman, sixty-five years of age, came to the clinic August 26, 1937, because of attacks of dizziness and fainting. She previously had undergone a thyroidectomy at the clinic in 1930 and had remained well until one week before her last admission. At that time she had had several attacks of dizziness which had lasted from a few minutes to two hours and she had lost consciousness on three occasions. She had never fainted before in her life. Physical examination revealed generalized arteriosclerosis and a systolic pressure of 200 mm. of mercury and a diastolic pressure of 110 mm. The results of routine laboratory tests were negative. A diagnosis of general arteriosclerosis, arteriosclerosis of the central nervous system, hypertension, vertigo and syncopal attacks was made.

**Comment on Case 8.**—In cases in which hypertension is associated with arteriosclerosis of the central nervous system or in cases in which arteriosclerosis of the central nervous system occurs alone, the patients not infrequently have attacks of transient unconsciousness which may be of the nature of a syncopal, petit mal, or grand mal attack. In cases in which arteriosclerosis of the central nervous system is associated with the hypertension the attacks may be the result of a vasospastic phenomenon but in cases in which arteriosclerosis occurs alone the attacks are most probably the result of destruction of the brain, which is caused by closure of smaller vessels and infarction.

### Paroxysmal Tachycardia Associated with Syncope

**Case 9.**—A woman, aged fifty-six years, came to the clinic on May 30, 1936, complaining of pain which had occurred intermittently over the cardiac region for thirteen years. The attacks had begun with a feeling of faintness and sinking sensation; the patient had felt as though she could not get her breath. There had been some associated pain in the thorax and left arm; at first, the attacks had occurred only two to four times a year and had lasted ten to fifteen minutes, but they gradually had increased in frequency and duration until at the time of her registration at the clinic she

was having one or more attacks a day. The longest attack had lasted for three hours. Dr. A. R. Barnes said that the patient was unconscious at times during the attacks. He observed her during one of the attacks and found that the heart rate was 180 to 200 per minute; the pulse was feeble and barely perceptible. His diagnosis was paroxysmal tachycardia associated with anginal pain and syncope. Dr. Barnes said that attacks of unconsciousness associated with paroxysmal tachycardia are not a common occurrence, but that they occur often enough to be of importance from the standpoint of differential diagnosis.

### Heart Block

*Case 10.*—A man, aged fifty-eight years, first came to the clinic on February 28, 1935, complaining of spells of unconsciousness, arthritis, and an injury of the head. The attacks of unconsciousness had first occurred in November, 1935; since then they had occurred irregularly; the frequency had varied from one attack every three to four months to one attack weekly. The attacks of unconsciousness had been of brief duration and had seemed to occur immediately after the patient had turned his head toward the left or after he had arisen from a stooping position. He had had a feeling as though a stocking cap were slipping over his head, and then he had become unconscious for a few moments. On one occasion slight muscle twitching had been noted and at another time urinary incontinence had occurred. A diagnosis of petit mal had been made and phenobarbital sodium (luminal) had been prescribed. This had not affected the attacks although he had taken as much as 6 grains (0.4 gm.) of the drug daily and had become very sluggish mentally. Routine general examination revealed that the patient had received a fracture of the skull as a result of an injury which had occurred one month before he came to the clinic, but the neurologic examination did not disclose any other abnormality. In view of the history and type of the attacks, an electrocardiogram was made and a complete auriculoventricular dissociation was noted.

*Comment on Case 10.*—Such transient attacks of unconsciousness may be easily confused with petit mal. The fact that the attacks had been initiated by turning the head would lead one to suspect a carotid sinus syndrome, but the diagnosis was made by the electrocardiogram. The carotid sinus syndrome is also accompanied by a slowing of the heart; therefore, one cannot be definitely sure of the diagnosis by merely counting the pulse rate.

### Epileptic Seizures

*Petit mal.*—The petit mal seizure typically consists of a sudden loss of consciousness that lasts for a few seconds. It may or may not be preceded by an aura. Automatic activity, such as walking, may continue throughout the attack.

The patient may or may not fall. When petit mal alternates with grand mal, the diagnosis of the minor seizure is obvious.

*Grand mal.*—Little difficulty is experienced in differentiating the typical grand mal type of epileptic seizure and other types of unconscious attacks. About 57 per cent of grand mal attacks are introduced by an aura. The aura manifests itself in many ways, but it most often is of the visceral type. The patient frequently describes it as an "all-gone feeling in the stomach" or a "hot (or cold) wave starting in the stomach." Unconsciousness quickly follows; it is prompt and complete; therefore, the patient falls and often injures himself. Unconsciousness usually is followed by a tonic phase in which the muscles are contracted, the patient is rigid, and cyanosis occurs and the veins become engorged. Generalized convulsive movements then occur. Biting the tongue, foaming at the mouth, micturition and defecation not uncommonly occur. As the convulsive movements abate, the muscles become flaccid. Examination at this stage almost always reveals that the pupils are dilated and unresponsive to light; the tendon reflexes are absent, and the Babinski's reflex is positive. In about three to ten, or even thirty, minutes after the onset of the attack, the patient gradually regains consciousness. He may then complain of headaches and somnolence. A deep sleep of several hours may follow the attack.

If the typical grand mal attack is witnessed or well described by a competent observer, little or no doubt remains as to the classification of the seizure. Often the witness is too terrified to observe accurately the sequence of events. It is always helpful and at times necessary for accurate diagnosis to observe a seizure. Attacks can usually be induced by hydration within a short time. The patient is placed in a hospital under the constant scrutiny of a trained observer. The fluid intake is increased considerably above normal, and the elimination of fluid is decreased by the subcutaneous injection of solution of posterior pituitary. This method of inducing seizures is of value when they are normally far apart and the patient is desirous of an immediate diagnosis.

Failure to realize that epileptiform seizures vary greatly from the common types leads to diagnostic errors. In our experience, atypical seizures are believed to be hysterical more often

than hysterical seizures are mistaken for epilepsy. In the following case the condition was wrongly believed to be hysterical because of the uncommon precipitating factor.

*Case 11.*—A young man described vaguely seizures which had followed startling situations. For example, the unexpected explosion of a firecracker at his feet had been followed promptly by loss of consciousness and convulsive movements which he could describe only from hearsay.

From previous experience, the patient expected physicians to frighten him in an attempt to produce an attack for observation. Consequently, the attempts were not genuinely startling. However, when an attempt was finally successful, dilated pupils which were unresponsive to light, and the presence of a positive Babinski's reflex, left no doubt as to the correct diagnosis.

Atypical epileptic seizures without prompt loss of consciousness, with so-called dream states in which loss of consciousness may be incomplete, with bizarre motor contortions instead of the usual tonic and clonic phases frequently lead the physician, who is unaware of these variants, to the wrong conclusion.

Classification of the type of seizure is difficult but discovery of the cause of the epileptic seizure is usually more difficult. The physician must not accept too readily the diagnosis of idiopathic epilepsy. Often, such a diagnosis is reversed by careful clinical and laboratory study.

We choose to look upon the epileptic seizure as a symptom of organic disease. True, there may be an underlying hereditary predisposition to the attack. Even so, if the precipitating cause can be detected and eliminated the patient may be relieved of seizures. The organic disease may be intracranial or extracranial. Intracranial causes include cerebral tumor, abscess, or an acute inflammatory focus. A small scar that is the result of some previous injury to the brain, may act as the epileptogenic focus. Cerebral arteriosclerosis and senile atrophy of the brain may produce convulsions. The organic disease may not be primarily intracranial. Generalized metabolic disturbances, such as tetany, pernicious anemia, and spontaneous hyperinsulinism, may produce seizures that readily are mistaken for idiopathic epilepsy. Consequently, an awareness of, and a careful clinical search for, possible etiologic factors must be undertaken. The following cases are examples of the practical importance of such a search.

### Grand Mal Seizures Produced by a Meningioma

*Case 12.*—A professional man, fifty years of age, had had recurrent convulsive seizures for six years. They had been characterized by a sudden, complete loss of consciousness and a generalized clonic convolution. He previously had been treated with phenobarbital sodium, which apparently had reduced the frequency of attacks. Physical examination of the head, which was almost completely bald, disclosed that the veins of the scalp were abnormally enlarged and radiating from a point which was situated to the right of the midline of the vertex. At this point the bone could be seen and could be felt to be abnormally thickened over an area which was about 5 cm. in diameter. Roentgenograms of the skull revealed thickening of the internal and external tables and increased vascularity of the skull in the region to the right of the midline of the vertex. Surgical exploration and successful removal of a parasagittal meningioma resulted in relief from the convulsive attacks.

### Grand Mal Seizures Associated with Tetany

*Case 13.*—A boy, aged fourteen years, had had convulsive seizures for six years. They had been introduced by a tingling sensation in the left foot, which had been followed by prompt loss of consciousness and generalized convulsive movements. At times, the tingling sensation had occurred without the usual subsequent events. Roentgenograms of the head revealed symmetrical cerebral calcification of the basal ganglia. The results of pneumo-encephalography were essentially negative. Although Chvostek's and Rousseau's signs could not be elicited, the concentration of serum calcium was 6.8 mg. per 100 c.c. and that for the phosphorus was 7.2 mg. per 100 c.c. of serum. Oral administration of powdered calcium lactate and cod liver oil increased the values for the serum calcium and serum phosphorus to, and maintained these values at normal levels. The patient has had no convulsive seizures for eighteen months and no sedative drugs have been given. Previous to the treatment of the tetany, the seizures had occurred about every four weeks in spite of the adequate dosage of phenobarbital sodium.

### Pernicious Anemia Associated with Attacks of Petit Mal

*Case 14.*—A woman who was in the sixth decade of life was brought to the clinic for examination because of failing memory and falling attacks of several months' duration. The attacks had occurred at irregular intervals without warning and had caused the patient to fall without protection. No serious injury had resulted but the relatives had anticipated it if the attacks were not relieved. The periods of unconsciousness always had been less than one minute and no convulsive seizures had been observed. Although the concentration of hemoglobin and the erythrocyte count were only slightly decreased, a study of blood smears disclosed a macrocytosis and a tendency to increased lobulation of the

polymorphonuclear leukocytes. The gastric contents contained no free acid after the administration of histamine. These findings led to a tentative diagnosis of pernicious anemia. The mental symptoms and petit mal-like attacks were tentatively attributed to the pernicious anemia. An expanding intracranial lesion could not be excluded definitely. It was decided to treat the pernicious anemia and determine the effects of such treatment on the symptoms. After one month of intensive administration of liver extract intramuscularly, the unconscious seizures stopped and the mental symptoms improved greatly.

### Hysteria

Hysterical attacks of coma are recognized by both the positive findings characteristic of the hysterical personality and the negative findings of other diseases which they may simulate. Frequently, the patient is known to have parents who are emotionally unstable. The patient frequently lives under an environmental situation that is not conducive to good mental health or he previously has been frankly psychoneurotic. This information may be helpful, but it must be remembered that such patients also are subject to organic diseases and that the symptoms of these diseases may be masked or complicated by psychoneurotic manifestations. The hysterical attacks are unlikely to occur when the patient is alone or in any situation in which serious injury is probable. The seizure is usually bizarre and histrionic; it often is accompanied by apparently purposeful movements. Friends or relatives may notice that the attacks occur only when some situation unpleasant to the patient is to be avoided. The seizures often vary from time to time, and unless the patient has witnessed epileptic seizures, the characteristic organic progression of epilepsy is not evident. A confident physician may alter the character of an attack that is in progress or he may induce an attack at will by proper suggestion. The ability to induce zones of anesthesia or paralysis by suggestion attests to the hysterical personality of the patient and allows for deductions as to the hysterical nature of the spontaneous seizures. During the attacks the patient incurs no serious injury, does not soil himself, the pupils are not fixed to light, and Babinski's reflex is negative.

We believe that emphasis on the necessity of careful clinical study to exclude organic disease

is justified. Judgment made with incomplete study is often fallacious. We have seen the neurologic manifestations of diabetic acidosis, hyperinsulinism, tetanus, lobar pneumonia, and other conditions, mistaken for hysteria. Pitfalls exist in the opinion arrived at by apparently effecting a restitution of consciousness by the time-honored procedures of painful pressure upon the supraorbital nerves, a dash of cold water in the face, and vigorous slapping of the patient. Such effects may be coincident with the normal recovery from an organic seizure.

The safest criterion for diagnosis is the ability to end the attacks of hysteria by psychotherapy. Suggestion alone may be effective in relieving symptoms. If the unconscious conflicts are discovered and if the patient is led to an awareness of them, cure is likely to be much more durable than it otherwise will be.

*Case 15.*—An unhappily married woman, twenty-eight years of age, had had unconscious attacks and convulsions for four years. Her mother had never been strong and had been considered by herself and daughter to be gifted in divining the future. The patient believed that her seizures had been precipitated by close proximity to electric apparatus. The first seizure had followed a thunder storm, during which lightning had struck a tree near the patient. The patient had not been injured by the lightning. Since the onset of the convulsive seizures the patient had lived with her mother, to whom she was greatly attached. The mother obviously had been alarmed by her daughter's spells. The mother had done all of the cooking, as proximity to the light meter in the kitchen was believed to have induced attacks. Incidentally, the patient was a poor cook, disliked that type of work, and much of the marital difficulty had been based on the husband's dissatisfaction with the food she had prepared. The seizures could be induced at will by bringing into the room the electric apparatus used in testing for reactions of degeneration and setting it so that the oscillator made a humming sound. Although the patient writhed vigorously on a narrow examining table she did not fall off. She forcibly closed her eyes more tightly when attempts were made to open them. The pupils were of normal size and reacted normally to light. The deep reflexes were present and the plantar responses were normal. After we had explained confidently to other physicians, who were present, that the abdominal muscles were contracting and that the patient would soon sit up, such a posture was immediately assumed. The attacks ended a few seconds after the audible oscillations were eliminated, although the current still was traversing the coils.

## EXFOLIATIVE DERMATITIS AS A MANIFESTATION OF MONOCYTIC LEUKEMIA (SCHILLING)

HAMILTON MONTGOMERY, M.D.\* and CHARLES H. WATKINS, M.D.

The Mayo Clinic, Rochester, Minnesota

WE HAVE emphasized recently the distinction between the so-called Naegeli type of monocytic leukemia (which may be regarded as a variant of myelogenous leukemia with predominance of monocytes) and the true Schilling type (monocytic leukemic reticulo-endotheliosis) in which the cells are derived from the reticulo-endothelial cells (reticular cells<sup>8</sup>). Either type of monocytic leukemia may have a primary, autochthonous, cutaneous origin and either type may start out with the clinical and histopathologic features of mycosis fungoides.<sup>4,8,11</sup> In our previous paper we emphasized the close relationship of monocytic types of leukemia to other forms of leukemia and, in fact, to any of the so-called lymphoblastomas.<sup>12</sup> Two cases of exfoliative dermatitis attributable to the monocytic leukemia of Schilling were included, the first of such cases to be reported in the literature.

In the last six months of 1937, we encountered four additional cases of monocytic leukemia of Schilling associated with exfoliative dermatitis.<sup>9</sup> In these latter cases, changes in the blood may have preceded changes in the skin. It is becoming increasingly apparent that cutaneous manifestations, and especially exfoliative dermatitis, are a frequent occurrence in cases of monocytic leukemia of Schilling, as high as 50 per cent of the cases reported (Doan and Wiseman quoted by Lynch) having been associated with cutaneous lesions either specific or nonspecific in type. This is in contrast to the relative rarity of specific cutaneous lesions associated with myelogenous leukemia, of which Goldhamer and Barney found only seventeen instances in the literature up to 1936, including only two of a generalized eruption. We wish, therefore, to give the history of two of the six cases of monocytic leukemia associated with an exfoliative dermatitis that we have encountered

at The Mayo Clinic and to discuss the cutaneous, histologic and hemocytologic findings in cases of monocytic leukemia of Schilling.

### Report of Cases

*Case 1.*—A man, aged seventy-six years, was seen at the clinic July 1, 1937, because of an exfoliative dermatitis. In September, 1936, a vesicular lesion had developed on the palm following a game of golf. A scaling dermatitis developed over the entire hand and spread gradually to other parts of the body. Within the last month before coming to the clinic an exfoliative dermatitis had developed involving the entire trunk, extremities and face. In December, 1936, a diagnosis of lymphatic leukemia had been made elsewhere, based on the finding of 21,850 leukocytes per cubic millimeter of blood. Seventy-five per cent of these were lymphocytes. He had received superficial roentgen therapy and various types of applications locally.

Examination at the clinic revealed the presence of a generalized exfoliative dermatitis. In addition, there were diffuse infiltrations in the skin, including small nodules on the legs and areas of lichenification. Hemorrhagic bullae were present on the hands and feet. There were impetiginous lesions about the mouth and nose and a very noticeable, diffuse, bronze-like pigmentation of the skin. Hemorrhagic lesions were not present in the mucous membranes nor was there any bleeding of the gums. General examination, including roentgenologic examination of the thorax, gave essentially negative results. Enlargement of the spleen or liver was not present. Hemocytologic studies revealed that the concentration of hemoglobin was 14.2 gm. for each 100 c.c. of blood; erythrocytes numbered 3,410,000 and leukocytes 67,400 in each cubic millimeter of blood. Eighty per cent of the leukocytes were of reticulo-endothelial cell origin. The hemocytologic picture was definitely that of monocytic leukemia of Schilling. A specimen for biopsy from the right heel showed a definite picture of lymphoblastoma and contained many monocytes, including typical grooving of many nuclei, which latter picture is characteristic of the Schilling type of monocytic leukemia. Similar findings were noted in a specimen removed from the region of the shoulder for biopsy. Repeated determinations of the number of leukocytes while the patient was under treatment varied from 67,000 to 16,000 in each cubic millimeter of blood, the proportion of reticulo-endothelial cells reaching as high as 90 per cent.

\*Dr. Hamilton Montgomery, Section on Dermatology and Syphilology, and Dr. Charles H. Watkins, Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

## EXFOLIATIVE DERMATITIS—MONTGOMERY AND WATKINS

The patient showed a definite response to two courses of local and systemic roentgen therapy. The last of December, 1937, Dr. Henry Michelson of Minneapolis reported that the patient was gradually failing. The hemocytologic diagnosis remained that of monocytic leukemia of Schilling (monocytic leukemic reticuloendotheliosis). The number of leukocytes had increased to more than 500,000 in each cubic millimeter of blood. Enlargement of the prostate gland with symptoms of obstruction developed. Ulcers appeared on the cutaneous surfaces. The patient died January 22, 1938. Postmortem examination was not performed.

*Case 2.*—A young man, aged twenty years, was seen at the clinic November 29, 1937, because of an exfoliative dermatitis. This had started as an area of scaling dermatitis on the thigh five years previously and had gradually spread to involve the entire skin of the body. During the past twenty months he had experienced a generalized exfoliative dermatitis. Examination revealed a universal exfoliation of the skin and, in addition, there was a generalized lymphadenopathy. He gave a history of having had a lymph node removed for biopsy some two years previously and a course of two treatments with roentgen rays had subsequently been given. Because of his age, however, it was felt that he had an atopic eczema. Various intracutaneous tests were performed with negative results. General examination revealed a slightly enlarged and tender liver. Albuminuria, grade 2, was present and a few erythrocytes were noted in the urine which could be explained most readily on a toxic basis. The hemocytologic findings on admission to the hospital were as follows: the concentration of hemoglobin was 8.4 gm. per 100 c.c. of blood; erythrocytes numbered 3,150,000 and leukocytes 16,800 in each cubic millimeter of blood; the percentages of the various types of leukocytes were as follows: lymphocytes, 8; monocytes, 5.5; neutrophils, 32; and eosinophils, 54.5. The high eosinophilia together with monocytes possessing nuclei suggesting a reticuloendothelial cell origin suggested the possibility of Hodgkin's disease.

A specimen for biopsy from the region of the right shoulder revealed a definite picture of lymphoblastoma. There was a very definite eosinophilia. There were many large cells, some with notched or indented nuclei and others with longitudinal grooving. Although it was recognized that the presence of grooved cells suggested that the leukemia was of the Schilling type rather than of the Naegeli type, the tremendous increase in eosinophils seemed to fit in better with the Naegeli type, which most hemocytologists regard as a variant of myelogenous leukemia. True Dorothy Reed cells of Hodgkin's disease were not demonstrable nor was the infiltrate like that encountered in cases of mycosis fungoides. Further hemocytologic studies showed that the number of leukocytes varied from 16,000 to 25,000 per cubic millimeter of blood; monocytes varied from 2 to 5.5 per cent; the percentage of eosinophils present on two occasions was 54.5. There were definite immature cells of the reticular cell series developing to monocytes and further hemo-

cytologic studies by one of us (Watkins) established the diagnosis of monocytic leukemia of Schilling.

The disease ran a febrile course with a septic type of temperature reaching as high as 100.8° F. (38.2° C.). He was given a course of treatment with filtered roentgen rays, directed toward the axilla and inguinal lymph nodes and he was sent home to take further treatment. Dr. A. C. Barry, of Norfolk, Nebraska, reported that the patient died on February 11, 1938, the result of cardiac decompensation. Shortly after his return home from the clinic, swelling of the feet and abdomen occurred. The cutaneous condition improved but the inguinal glands became larger and more tender than they had been previously. It was believed that the mediastinal lymph nodes had become involved but circumstances prevented the carrying out of further roentgenologic studies.

### Cutaneous Manifestations

Mercer emphasized that two elementary types of cutaneous lesions are seen in cases of monocytic leukemia: "(1) macules and papules which, when seen early, simulate a secondary syphilid but later become slate blue and (2) pale, shotty papules which may lie deeper in the corium and are felt more easily than they are seen." In our experience, as well as in that of others,<sup>4,5</sup> these two types of cutaneous lesions are not specific for monocytic leukemia of Schilling, but may be encountered in other forms of lymphoblastoma. Purpuric, hemorrhagic and bullous lesions are frequently encountered early in the course of the disease, in contrast to their usual appearance as a terminal manifestation in cases of other forms of lymphoblastoma. They may result from specific infiltrations of the skin. Ulcerative gingivitis and bleeding of the gums, which appear to be frequent manifestations of monocytic leukemia, were not associated with exfoliative dermatitis in our six cases. The development of ulcers and furuncle-like lesions is usually a late or terminal manifestation of the disorder. Loveman was the first to emphasize that the disease may begin with indurated, eczematoid plaques similar to those seen in the early stage of mycosis fungoides.

Epstein and MacEachern have recently stated that the characteristic cutaneous lesion of Hodgkin's disease is the so-called exfoliative erythroderma (dermatitis). In our experience, however, exfoliative dermatitis may be a cutaneous expression of any one of the lymphoblastomas, including mycosis fungoides, Hodgkin's disease, lymphosarcoma and various types of leukemia.

It may be either a primary or a secondary manifestation. A third to a half of all instances of exfoliative dermatitis encountered among patients more than forty years of age are the result of lymphoblastoma, but a lymphoblastomatous etiology in cases of exfoliative dermatitis must be suspected at any age, as is exemplified by Case 2. Fortunately, the histopathologic picture of exfoliative dermatitis remains that of the original benign dermatosis or lymphoblastoma causing the exfoliative dermatitis,<sup>7</sup> although it may not be specific as to the type of lymphoblastomatous involvement. It may be necessary, therefore, to correlate clinical, histopathologic, roentgenologic and hemocytologic data. At times, removal of a lymph node for biopsy is necessary in order to determine the type of lymphoblastoma present.

### Histopathology

The cutaneous, histopathologic changes were specific for monocytic leukemia of Schilling in four of the six cases associated with an exfoliative dermatitis, and were suggestive in the other two cases. Touch smears made from the specimen for biopsy at the time of excision presented a picture identical with that of the blood smears in two cases. In the earliest lesions of monocytic leukemia of Schilling the histopathologic picture may duplicate that of mycosis fungoides, which is not surprising in that in both conditions there is involvement of the reticulo-endothelial system of the skin together with increase in Gitterfasern (lattice fibers).

If a specimen for biopsy is taken from a well-developed nodule, plaque, or zone of exfoliation, characteristic histopathologic changes are seen. There is an infiltration ranging from a diffuse to a dense nodular character limited at times to the upper part of the cutis, but often extending to the subcutaneous tissue. The epidermis may be involved in the process as in mycosis fungoides or there may be a grenze or border zone separating the epidermis from the infiltrate. The infiltrate occurs especially about the smaller blood vessels, which show proliferation of the endothelium and adventitia. The infiltrate is composed chiefly of monocytic cells of varying degrees of maturity. Indented, kidney-shaped nuclei and notching of nuclei are seen, but diagnosis rests on the demonstration of many monocytes which show a longitudinal

grooving of the nucleus.<sup>2</sup> This longitudinal grooving is actually the result of the arrangement of the chromatin but in slides for histopathologic study appears as a hyperchromatic longitudinal groove of the nucleus.

Monocytes with longitudinal grooving of the nuclei may occasionally be seen in cases of mycosis fungoides and Hodgkin's disease of the skin. In cases of mycosis fungoides, however, there is a multiplicity of cellular types with pyknosis and karyorrhexis of individual cells and clumping of cells to form pseudo-giant cells, whereas in true cases of Hodgkin's disease of the skin, Dorothy Reed cells characteristic of this disorder are usually present. In cases of lymphatic leukemia of the skin the lymphocytic cells composing the infiltrate are smaller in size than the monocytes and lack the morphologic features of the latter. Histopathologic or even hemocytologic distinction between the Naegeli and Schilling types of monocytic leukemia may at times be difficult, especially when there is a pronounced degree of eosinophilia in both tissue and blood, as exemplified by Case 2. Histopathologic diagnosis of the Schilling type is dependent on the demonstration of numerous monocytes with longitudinal grooving of the nuclei and must be corroborated by hemocytologic studies. Because of distortion in shape and character of the cells, the result of fixation and imbedding in paraffin, a final diagnosis of monocytic leukemia of Schilling is dependent on the result of touch smears from a specimen for biopsy or on hemocytologic studies.

### Hemocytology

Monocytic leukemia of the Schilling type is distinguished from monocytic leukemia of the Naegeli type by the fact that the monocytes in the former develop directly from endothelial cells, whereas in the latter they develop from the myeloblast or stem cell. The Schilling type of monocytic leukemia, like the Naegeli type, may occur in acute, subacute, chronic, and even rarely, in aleukemic phases, depending on the degree of immaturity present. In the acute Schilling type, it is often difficult to distinguish this condition from an acute leukemic reticuloendotheliosis. The distinction depends on finding a great majority of the circulating leukocytes showing a tendency to develop into cells with the characteristics of the monocyte, whereas in

leukemic reticulo-endotheliosis the predominating cell is more lymphocytic in character. Unless the predominating cell is of the monocytic type, the disease should be regarded as a leukemic reticulo-endotheliosis.

In the more chronic cases of leukemia, this distinction is readily made. In practically all cases of the Schilling type of monocytic leukemia, true reticular cells may be found in the circulating blood (Fig. 1). These cells are large, are usually much larger than the average leukocyte and have an eccentric nucleus that is almost spherical. The chromatin strands usually originate from the nuclear membrane and usually run transversely across the nucleus. These strands are very thin and are sharply distinguished from the parachromatin. Under a high power of magnification these strands are found to be made up of small granules, which when stained with Wright's stain, take a blue color. The nuclear membrane is very smooth in outline and is sharply defined. Usually one or more nucleoli are found. The nuclear pattern is so clear cut that the nucleus stands out prominently from the remainder of the cell. The cytoplasm is usually abundant, is blotchy in appearance and usually takes on a grayish-blue color when Wright's stain is applied.

During differentiation of this cell toward the monocyte, the chromatin strands become thicker and seem to bend on themselves slightly, producing what appears as a groove, running across the nucleus, which has usually become slightly elongated at this time.<sup>8</sup> Because grooving is so distinct and because it persists almost to the stage of complete maturity of the monocyte, it becomes a great aid in distinguishing the Schilling type of monocytic leukemia from the Naegeli type. In very acute forms of the Schilling type of monocytic leukemia most of the cells will be reticular cells with only a few of the cells approaching mature monocytes in character, whereas in the more chronic forms, only an occasional very immature cell will be found. The grooving tendency persists throughout the intermediate and mature stages. This is not usually associated with the more frequent forms of leukemic reticulo-endotheliosis.

The Naegeli type of monocytic leukemia is often regarded as one form of myelogenous leukemia because of its tendency to terminate usually as a typical myelogenous leukemia with

large numbers of intermediate forms and some mature forms of all types of the granular leukocytes. The parent cell in this type of leukemia is the myeloblast and the diagnosis may be made by the recognition of this cell and the inter-



Fig. 1. Differences between the various types of cells in monocytic leukemia; the left column, Naegeli type, from top to bottom illustrates the changes from the myeloblast to the relatively mature monocyte. The right column, Schilling type, represents stages in development from the reticular cell to the mature monocyte. (Reduction of colored illustration from first article on monocytic leukemia, *Arch. Int. Med.*, 60:51-63, (July) 1937.)

mediate stages through which it must pass in its development into the mature monocyte. The myeloblast is a relatively large cell, containing a large nucleus which makes up a great portion of the entire cell, the cytoplasm being a relatively thin band of substance around the nucleus, if compared to the much more abundant cytoplasm of the reticulo-endothelial cell. The nucleus of the myeloblast has a very thin nuclear membrane, the chromatin is usually granular, but it may occur in very fine strands. With Wright's stain, the chromatin is blue and is in very sharp contrast to the pink-staining parachromatin. The chromatin is usually in a sieve-like arrangement and is somewhat in the background, the parachromatin predominating.<sup>2</sup> This sieve-like chromatin structure is very char-

acteristic of the myeloblast and differs greatly from the pattern seen in the nucleus of the reticulo-endothelial cell. Several nucleoli are present. During the stage of differentiation, the nucleoli disappear, the chromatin becomes more prominent and there is a gradual development of the string-like clumps of chromatin that are so typical of the mature monocyte. Concomitantly, the cytoplasm gradually loses its bluish tint and becomes slate gray in color, so characteristic of the mature monocyte.

One is not justified in making a diagnosis of the Naegeli type of monocytic leukemia unless the myeloblast has become differentiated into monocytes to the practical exclusion of the other myeloid leukocytes. In an occasional case, there may be only a slight predominance of monocytes, and in such a case it would be better to make the diagnosis of myelogenous leukemia. It is probable that the Naegeli type of monocytic leukemia is a variant of myelogenous leukemia but it seems, in the light of our present knowledge, that the diagnosis of the Naegeli type of monocytic leukemia is justified when differentiation of the myeloblasts through intermediate forms into monocytes occurs, to the practical exclusion of other myeloid leukocytes.

#### Prognosis and Treatment

Any type of leukemia eventually proves fatal, but it is the impression of one of us (Watkins) that the Schilling type is a more benign form than the Naegeli (myelogenous) type of monocytic leukemia. The two patients referred to in this paper have died, but the other four patients who had exfoliative dermatitis associated with a monocytic leukemia of Schilling were still living in February, 1938. In all six cases there was a history of cutaneous lesions of various types appearing on the extremities, including the face, months to years before the disease was recognized. Thus, in Case 3 of our first paper, cutaneous lesions developed on the arms and thighs in March, 1931. When the patient was seen at the clinic in April, 1935, the clinical and histologic picture was that of mycosis fungoides, although in retrospect many monocytes typical of the Schilling type of leukemia were demonstrable. The characteristic picture of exfoliative dermatitis and of monocytic leukemia of Schilling was present when the patient was seen in June, 1936. There has

been some improvement in the cutaneous condition since then.

In Case 4 of our first paper, the patient, a young woman, has had a generalized exfoliative dermatitis since April, 1933, which was diagnosed elsewhere as lymphatic leukemia, and then on examination at the clinic in April, 1935, as a monocytic leukemia. The patient has recently shown features of both conditions. The long duration of the dermatitis in these two cases might possibly be explained on the basis that the condition started out as mycosis fungoides and lymphatic leukemia, respectively and, later, evidence of monocytic leukemia of Schilling developed. It does seem, however, that these six patients who have exfoliative dermatitis tend to run a relatively benign course. Case 2 (Case 3 in a previous report<sup>9</sup>) is the only one in which there was any evidence of enlargement of the liver or spleen or a febrile course, all of which signs are frequently encountered in cases of monocytic leukemia of Schilling and may occur independent of any cutaneous lesions.<sup>10</sup>

The treatment of monocytic leukemia of Schilling, like that of other forms of leukemia, is only palliative and consists essentially of radiotherapy. High voltage roentgen therapy or radium therapy is indicated if the process is not too acute, but the dosage should be given with careful observation of the hemocytologic changes in order to determine the resistance of the cells to treatment. Moderate rather than intensive dosage usually gives the best results. The cutaneous lesions frequently involute temporarily, after superficial local roentgen therapy, or indirectly as the result of systemic high voltage roentgen therapy. In the cases of very acute leukemia, treatment is of no avail.

#### Summary and Conclusions

Exfoliative dermatitis in our experience is a rather frequent cutaneous manifestation of monocytic leukemia of Schilling. It has not been emphasized as such in recent articles in the literature. There are various other types of cutaneous manifestations of monocytic leukemia. The clinical, histopathologic and hemocytologic findings in six cases of exfoliative dermatitis associated with monocytic leukemia of Schilling are briefly referred to. A specific cutaneous pathologic picture is frequently encountered. The hemocytologic distinctions between the Schil-

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ling and Naegeli types of monocytic leukemia, however, are diagnostic. It is important to distinguish between these two types of monocytic leukemia because of their different prognosis and response to treatment.

### References

1. Epstein, Ervin, and MacEachern, Katherine: Dermatologic manifestations of the lymphoblastoma-leukemia group. *Arch. Int. Med.*, 60:867-875, (Nov.) 1937.
2. Giffin, H. Z., and Watkins, C. H.: The distinction between splenic anemia and subleukemic splenic reticuloendotheliosis. *Am. Jour. Med. Sc.*, 188:761-767, (Dec.) 1934.
3. Goldhamer, S. M., and Barney, B. F.: Myelogenous leukemia with cutaneous involvement. *Jour. A.M.A.*, 107: 1041-1043, (Sept. 26) 1936.
4. Loveman, A. B.: Monocytic leukemia cutis; report of a case with biopsy studies. *South. Med. Jour.*, 29:357-364, (April) 1936.
5. Lynch, F. W.: Cutaneous lesions associated with monocytic leukemia and reticulo-endotheliosis. *Arch. Dermat. and Syph.*, 34:775-796, (Nov.) 1936.
6. Mercer, S. T.: The dermatosis of monocytic leukemia. *Arch. Dermat. and Syph.*, 31:615-635, (May) 1935.
7. Montgomery, Hamilton: Exfoliative dermatosis and malignant erythroderma; the value and limitations of histopathologic studies. *Arch. Dermat. and Syph.*, 27:253-271, (Feb.) 1933.
8. Montgomery, Hamilton, and Watkins, C. H.: Monocytic leukemia; cutaneous manifestations of the Naegeli and Schilling types; hemocytologic differentiation. *Arch. Int. Med.*, 60:51-63, (July) 1937.
9. Montgomery, Hamilton, and Watkins, C. H.: Exfoliative dermatitis as a manifestation of monocytic leukemia (Schilling). *Proc. Staff Meet. Mayo Clinic*, 13:294-297 (May 11) 1938.
10. Osgood, E. E.: Monocytic leukemia; report of six cases and review of one hundred and twenty-seven cases. *Arch. Int. Med.*, 59:931-951, (June) 1937.
11. Wayson, J. T., and Weidman, F. D.: Aleukemic reticulosis; an additional member of the group of so-called cutaneous lymphoblastomas. *Arch. Dermat. and Syph.*, 34:755-770, (Nov.) 1936.
12. Wile, U. J., and Stiles, Frank, Jr.: Clinical mutations in lymphoblastomas. *Jour. A.M.A.*, 104:532-536, (Feb. 16) 1935.

## ARTIFICIAL IMPREGNATION

R. T. SEASHORE, M.D.  
Duluth, Minnesota

ARTIFICIAL impregnation is fertilization resulting from the artificial transfer of active semen from the male to the female.

The literature on this subject is chiefly foreign. Since 1902 there have appeared only twenty-four articles in the American literature, and among these the case reports are not numerous. With this in view it was considered worthwhile to present a brief review of the available literature, and also to present a case in which artificial impregnation was successfully carried out.

The first reference to mammalian artificial impregnation is that of a 15th century Arab chieftain who desired to sire his mare by an enemy chieftain's prize stallion. Unable to do so, his men managed to steal some semen from the stallion, which was then inserted into the mare's vagina. Successful impregnation is said to have occurred.<sup>1</sup>

However, the first authentic and recorded report came from Spallanzani, in 1780. He recorded an artificial impregnation of a Spaniel bitch, as a result of which she bore a litter of four pups.<sup>2</sup>

John Hunter, early in the 19th century, made the first recording of artificial impregnation in the human. In his case the husband suffered from hypospadias, and coitus was impossible. The semen was collected artificially and trans-

ferred to the wife's vagina, conception resulting.<sup>2</sup>

From 7 to 10 per cent of marriages are reputed to be sterile. With that in mind, the procedure as here described is occasionally justified to bring family happiness to an otherwise childless couple who have the requisites of good parents.

Who should be submitted to this procedure? First, we should use this opportunity to practice good eugenics, and encourage the procedure only in those who are apt to improve society. Second, it should be done only in those cases where both the husband and wife are desirous of the procedure after due consideration.

Biologic indications include male infertility due to hypospadias or other abnormality, or to aspermatogenesis from any cause. Indications from the female standpoint, assuming that the tubes, ovaries, and uterus are normal, include stenosis of the cervix, dyspareunia, abnormal vagina, and chemical incompatibilities with the sperm.

An effort must first be made to procure, if possible, a normal impregnation by correcting any abnormalities, improving the general health, changing the vaginal flora and chemical reaction, stimulating spermatogenesis with hormonal therapy, and by whatever other means are indicated. Of course, the procedure should never be carried out in the presence of tubal or cervical infection.

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And, we may add, the unfit from a social or eugenic standpoint should not be submitted to this procedure.

### Legal Aspects

The attorney, who served in the case to be presented, found no mention of any ruling or any discussion of this subject in the legal literature. Consequently moral dictates must be our guide in handling these cases. Also, it is advisable to use the utmost legal precaution for all concerned.

When the husband himself is the source of the sperm, the legal aspects are not great, but even so it is wise to have a signed statement acknowledging understanding of the procedure and willingness to comply. However, in the case of the sterile husband, where the sperm is obtained from a donor, obviously legal entanglements of a greater variety can arise. Anyone contemplating this procedure should certainly read the excellent article of Seymour and Koerner in *The Journal of The American Medical Association* for November 7, 1936, in which they discuss the legal, moral, and psychologic aspects of the procedure very thoroughly.<sup>9</sup>

Among the entanglements that may arise are accusations of adultery. The husband, having proof of his sterility at the time of conception, may use his wife's pregnancy as grounds for divorce. He may refuse to accept the responsibility of supporting the child. The donor might claim the custody of the child. The child's status in the settlement of an estate might be questioned. The child could even claim a share in the donor's estate.

The procedure, of course, should not be done unless there is an intense desire for a child on the part of the wife, and the husband is entirely agreeable. It is wise to delay several months in order to be certain that it is not merely a hasty and transient desire on their part. During this time the husband and wife could be treated in an attempt to establish normal conception.

For the protection of everyone concerned, legal papers should be drawn in which the wife and the husband accept full responsibility for the procedure, and also accept the child as their legal offspring. Seymour and Koerner, in the above mentioned article, present this excellently worded consent statement to be signed by the husband and the wife:

"I, ..... , residing at ..... of my own free will and volition have requested Dr. ..... to inseminate my wife artificially with the sperm of a male selected by Dr. ..... This request has been made with the full knowledge and consent of my wife, whose authorization is hereto annexed. I am making this request, because it is not possible for me to procreate and because both my wife and myself are extremely anxious to have a child and because our mutual happiness and the well being of my wife will be best served by this artificial insemination.

..... (LS)

On this ..... day of ..... 19...., before me came ..... , to me known and known to me to be the person described herein and who acknowledged to me that he executed the foregoing consent.

..... (LS)

I, ..... , join in my husband's request above stated and hereby authorize Dr. ..... to inseminate me artificially with the sperm of a male selected by Dr. .....

..... (LS)

On this ..... day of ..... 19...., before me came ..... , to me known and known to me to be the person described herein and who acknowledged to me that she executed the foregoing consent.

..... (LS)

If the people involved are strangers to the physician they also recommend that the thumb prints be placed alongside their signatures to further identify them, thus further reducing the possibility of trickery through false identification. These consent records, made in duplicate, are then sealed and filed away in separate safe places, to be available and unsealed only in case of legal complications.

It is well to have a separate consent statement signed by the donor accepting release of the child from his custody, and waiving all claims to it. It also is then filed away separately. If the donor is married, his wife should also sign the document to prevent her from later accusing him of adultery, and to minimize any possible family discord which might result.

Will the child be a legal heir, or must he be adopted by the father through court procedure? Inasmuch as no legal ruling states that he is not a legitimate heir, it is fair to assume that the consent signatures of the husband and wife are sufficient to legalize him.<sup>9</sup>

**Psychologic Aspects**

The process should be kept as secret as possible, the minimum number of people knowing of the affair, and after conception nothing should be said about it in order that the couple may more readily forget the artificial character of the conception. Likewise the donor should be one who is unknown to them, and one who is not apt to encounter them in any way. They should be told that the donor is in excellent health, and that he resembles the husband in appearance and temperament, all this to encourage the association of the child with the husband rather than the donor and thus to diminish the possibility of estrangement of affections.

Psychologic influences of a lesser degree may rest on the donor also. If he knows who the child is he may develop affection for the child, and even to some extent for the mother. Even if he does not know the child, his thoughts may wander in that direction and influence his mental makeup.

For the good of the child, he should be kept in ignorance of the affair, at least until he is able to meet the knowledge with intelligent understanding.

Selection of the donor should be done carefully. He should be someone of the same nationality, physique, appearance, and temperament as the husband, so that if the donor's characteristics are dominant in the child they will resemble the husband's as nearly as possible. Naturally, he should be in good health, both physically and mentally, and of good family heritage. The donor should be advised to keep the affair secret so that it will not arise on later occasions to plague him.

Objections to the procedure may be esthetic, psychologic, and moral attitudes. However, any couple really desirous of a child will willingly overlook these things after they are fully explained. Objections on the part of prospective donors may be even harder to handle. Finding a good donor may be the hardest part of the task. Other objections are complications such as infection and tubal and abdominal pregnancy which might conceivably occur. However, careful technic should make this risk no greater than normal impregnation. Mental shock after the pregnancy occurs must be thought of as a possibility, which suggests that the procedure should

not be carried out in any individual who might be subject to mental unrest.

**Technic**

The semen is collected from the husband or donor either by frictional ejaculation or by vesicle massage into a sterile vessel. It could be collected also by coitus interruptus or by condom specimen but these methods are less aseptic. The semen should be examined to be certain that the spermatozoa are present in large numbers (about 1,000,000 per c.c.), active, and not over 20 per cent are dead or abnormal.<sup>2</sup> Attempts at placing the donor's semen into the vas or vesicles of the husband have not proven successful.<sup>10</sup>

The woman prepares herself with a cleansing douche and is placed in the lithotomy or the knee chest position. The spermatic fluid is then instilled by means of a Eustachian catheter and a syringe into the vagina, cervical canal, or uterine cavity, the latter probably being the most effective. Various authors recommend the use of from 0.1 to 1.00 c.c. of the spermatic fluid. It should be done slowly and gently, observing aseptic precautions carefully. The patient is kept lying down for a short while afterward.

Just before or at the time of ovulation is the time of choice for carrying out the procedure. The methods for determining this will not be mentioned here except to state that in the twenty-eight day cycle, anywhere from the tenth to the fourteenth day after the onset of menses will probably be right in most cases.

If failure occurs it is justifiable to repeat the process several times inasmuch as ovulation may have failed to occur within the few days following insemination, due either to delay or failure of the descent of the ovum.

**Case Report**

The case to be presented is that of a couple who were childless after six years of married life. No pregnancies had occurred. The wife had been in good health except for scarlet fever when thirteen years old, complicated by acute nephritis which cleared up, and for three attacks of rather severe cystitis. The husband had always been in good health except that he was sterile as a result of orchitis complicating mumps. Attempts to stimulate spermatogenesis in him by general care and Antuitrin "S" over a six months period had failed only an occasional dead spermatozoon being found in the specimen.

At their suggestion it was decided to impregnate her artificially with the sperm of a donor. I delayed them for several months, giving them plenty of time to think

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it over. Legal papers were drawn and filed away in safe places that they know of and will have access to only if necessary. A donor of good health and family was selected, with the precaution that he was unacquainted with the patient or her husband.

A specimen of spermatic fluid was collected by the frictional ejaculation method into a sterile container, and was then examined and found to have an adequate number of active spermatozoa and a minimal number inactive and abnormal.

The recipient, having prepared herself with a cleansing douche before coming to the office, was placed in the lithotomy position, the cervix exposed in the usual manner and painted with a mild antiseptic. One-half c.c. of the spermatic fluid was then instilled into the uterine cavity with the aid of a syringe and a Eustachian catheter. She was kept lying down for a half hour and then sent home. She promptly became pregnant and has since that time been delivered of a normal child.

Since the time of the insemination not a word has been said about it to this couple. To all appearances they are a happy father and mother and betray no evidence of regret on their part.

### Bibliography

1. Brewer, H.: Artificial insemination. *Marriage Hygiene*, 2: 420-427, (May) 1936.
2. Cohen, J.: Artificial insemination. *New Orleans Med. and Surg. Jour.*, 85:817-822, (May) 1933.
3. Cohen, J.: Artificial insemination. *New Orleans Med. and Surg. Jour.*, 86:730-731, (May) 1934.
4. Dickerson, R. L.: Artificial impregnation; essays in tubal insemination. *Am. Jour. Obst. and Gynec.*, 1:255-261, 1920.
5. Lifvendahl, R. A.: Tubal pregnancy following insemination. *Am. Jour. Obst. and Gynec.*, 25:733-735, (May) 1933.
6. Loessl, H.: Practical use of artificial impregnation in animals. *Vet. Med.*, 29:441-443, (Oct.) 1934.
7. Seymour, F. I.: Viability of spermatozoa in cervical canal. *Jour. A.M.A.*, 106:1728, (May 16) 1936.
8. Seymour, F. I.: Eugenics in practice. *Marriage Hygiene*, 3:44-48, (Aug.) 1936.
9. Seymour, F. I., and Koerner, A.: Medicolegal aspects of artificial insemination. *Jour. A.M.A.*, 107:1531-1534, (Nov. 7) 1936.
10. Stepiita, C. T.: Physiologic artificial insemination. *Am. Jour. Surg.*, 21:450-451, (Sept.) 1933.

## MODERN TREATMENT OF BURNS

### An Evaluation of Various Methods Used in 968 Cases in the Cook County Hospital

KARL A. MEYER, M.D., F.A.C.S., and J. LESTER WILKEY, B.S., M.D.  
Chicago, Illinois

SINCE Davidson<sup>7</sup> suggested that tannic acid applied to burns forms a protective crust, the treatment of burns has been greatly simplified. When treating burns, whether they be severe or moderate, a definite program must be maintained if success is to be achieved. Regardless of the program decided on, we must plan to:

1. Treat the initial shock
2. Prevent absorption of toxins from the burned surfaces
3. Combat fluid loss
4. Shorten the period of disability by promoting healing
5. Avoid permanent deformity.

During the past decade various types of treatment have become popular, and many different dyes, antiseptics, and escharotics have been used.

In the Cook County Hospital we treated 968 burns from 1933 to 1937 inclusive. Some were superficial burns, others second degree burns, but a greater number were severe third degree burns, widespread over the body. We have had

occasion to use almost every type of treatment. In this paper we shall attempt to evaluate the various treatments as used by the surgical services of this hospital.

### Treatment of the Initial Shock and Toxemia

The patients that we see, or at least a great percentage of them, are in shock and are very toxic. One of our great problems is to bring the patient out of the shock and to lessen the toxemia. This brings up the great present day controversy as to whether the morbidity and the mortality that occurs in patients with burns is due to the absorption of a toxic substance formed at the site of the burn, to the loss of body fluids through the open skin surfaces causing gradual dehydration, or to the toxemia from absorbed products of infection which occurs in the burned areas.

Underhill,<sup>15</sup> in 1923, showed that patients with extensive superficial burns might have a blood concentration of 209 per cent of the normal. He felt that all of the symptoms following severe

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burns could be accounted for by this marked blood concentration.

Davidson<sup>7</sup> claimed that a toxin was formed at the site of the burn, the absorption of which caused a constitutional reaction.

Rosenthal<sup>12,13</sup> in a series of experiments showed that a substance was present in the blood of burned humans, a burn toxin, which was capable of lowering blood pressure, and he demonstrated that this burn toxin could be neutralized by the serum of healed burned sheep, pigs, and humans.

Kapsinow's<sup>9</sup> experiments, on the other hand, showed that toxins are probably not absorbed from the burned site. He was not able to find evidence of absorption after applying strychnine and phenolphthalein to burned areas.

Wells<sup>16</sup> states that there is increasing proof that bacterial infection rather than proteolytic toxins is the cause of death in the severely burned.

Aldrich<sup>1</sup> popularized the rôle of infection in burns and showed that the toxemia of a burned patient was not due to the absorption of a burn protein, or a shifting of the water balance, but to an invasion of the body by virulent forms of streptococci which entered through the burned areas.

Regardless of whether it is a toxin, an infection, or loss of vital tissue fluids, the possibility of the presence of one or all of these factors must be considered and combated.

A rule that we adhere to strictly is that any patient who has had one-eighth or more of the body surface burned is treated for shock whether it is present or not. Regardless of the local care of the burn, the shock must be combated first.

We find that shock following burns is best treated by:

1. Administration of morphine for control of pain.
2. Intravenous administration of saline and glucose.
3. A heat cradle to the body, with enough light to maintain constantly a heat of 90 degrees.
4. Blood transfusion.
5. Stimulants, when necessary.

The morphine is given in sufficient quantity to control pain and restlessness. The saline and glucose mixture is given to replace the lost blood chlorides and to bolster the liver. We give, as a

rule, 1,000 c.c. of saline and glucose per 25 pounds of body weight in twenty-four hours. Some of the members of our staff add gum acacia to the saline and glucose mixture.

Blood transfusion is a routine procedure for patients in shock. The blood bank system in the Cook County Hospital makes it possible for the patient to receive blood as soon as thirty minutes after admission to the hospital. We feel that the immediate accessibility of the blood to these patients who are severely burned, has materially aided in lowering our morbidity as well as the mortality rate.

### The Control of Fluid Loss

The loss of blood plasma and the concentration of blood is probably the cause of death in the first twenty-four hours. The dressing of choice must be the one that will prevent the loss of fluid from the blood stream by adequately sealing the open surfaces.

### The Tannic Acid Treatment

In 1925, Davidson suggested the use of tannic acid in the treatment of burns. He showed that tannic acid would precipitate the broken down tissue proteins and close off the capillary beds, thereby preventing the loss of body fluids.

In the past ten years, tannic acid has been used very successfully in the Cook County Hospital in the treatment of burns.

When the patient comes out of the initial shock the wounds are cleansed of grease, dirt, and grime. Most of the burns that we see are covered with oils and grease. If the patient is not in shock, he is placed in a bath tub of warm water containing sodium bicarbonate. The bath tub is scrubbed daily and kept covered to prevent further contamination of the burns. The surgeon and his assistants wear caps, masks, sterile gowns and gloves. Fat solvents, such as benzine and ether, are used to remove the grease and oil without undue scrubbing. The unburned skin surrounding the wound is scrubbed with soap and water. The burns are washed with white soap and a solution of boric acid. We use white soap instead of green soap, because green soap was found to be more irritating (Koch).<sup>10</sup> The burned area is thoroughly débrided after the initial cleansing. In a majority of the cases the blisters and blebs are widely opened under aseptic technic using sterile instruments, and the loose areas of skin are removed. We believe that

opening of these blisters removes the fluid which contains the organisms that may later cause infection. The patient is placed on sterile sheets.

The burned areas are then sprayed with a 5 per cent aqueous solution of tannic acid every fifteen minutes until a dark mahogany colored coagulation is obtained. The heat cradle with enough light to produce a heat of 90 degrees is then placed over the body. Sheets are placed over the cradle. The coagulum is allowed to remain in place until it becomes loose or its edges curl up as healing occurs. When this happens it is cut away. If serum collects underneath the crust, as may occur when there has been complete destruction of the tissues, or should infection cause its loosening, the coagulum is removed sufficiently to allow for drainage or subsequent treatment.

From the latter part of 1933 to 1937 inclusive, 272 patients were treated by this method. Of this number thirty-four died, giving a mortality rate of 12.1 per cent. One hundred and eight showed infection.

#### The Compound Aniline Dye Treatment

In 1929, Aldrich<sup>2</sup> took cultures from the burned areas and from the serum of the blisters following burns. In all patients who were severely burned, he found growths of streptococcus hemolyticus as well as other organisms. He found that the persistent presence of these organisms was in direct proportion to the severity of the toxemia, as well as the signs of sepsis.

Aldrich felt that the success of tannic acid depended on whether or not the burn to which it was applied was sterile. He stated that if a burn is to be sealed and if this sealing is to carry out its function of preventing fluid loss, infection beneath this sealing must be avoided. A great number of infections beneath the tannic crust were being reported. So Aldrich looked for a new escharotic that would be antiseptic and non-toxic. He finally decided on gentian violet. Gentian violet is a specific antiseptic for gram positive organisms but its weakness is that it has no effect on the gram negative organisms. He developed a compound of aniline dyes using gentian violet, three parts by weight, brilliant green, 2 parts by weight, and neutral acriflavine, one part by weight. This mixture is known as "Aldrich Dye Mixture." Two grams of this mixture are dissolved in 100 c.c. of water and used in the form of a spray.

We have used the Aldrich treatment in 104 cases. Our routine is as follows:

No preliminary clean-up is done unless the patient has been treated previously with grease, oils, or ointments. If so, then these are removed by soft sponging with ether. Under strict asepsis the blebs are opened and the loose skin cut away, but no extensive débridement is done. The patient is placed under a heat cradle and sprayed every hour by means of an atomizer. An eschar develops in about eight hours.

Continual watching of the crusts are necessary. This crust does not hide infection as does tannic acid but becomes moist if there is any underlying pus.

If infection develops, the softened areas are excised, the underlying area is dried with a sterile sponge and the dyes reapplied. This technic is continued until good granulations form. One annoyance is that the dyes stain the bed linen which necessitates frequent changes.

We used this treatment in 104 patients with second and third degree burns of the abdomen, trunk and extremities. Of the 104, nine died (a mortality of 8.7 per cent) and only ten became infected.

#### The Gentian Violet Treatment

Following the suggestion of Aldrich,<sup>1</sup> we treated 125 burns with a 1 per cent aqueous solution of gentian violet. Most of the burns treated by this method were second degree burns of the extremities. It was used on both clean and contaminated burns after sufficient débridement and removal of greases and oils was done. Strict asepsis was adhered to. The gentian violet was applied by means of sterile cotton pledges. The patient was then put under a heat cradle. Of the 125 cases treated by this method, there were only two deaths or a mortality of 1.6 per cent. There were twenty-two infections.

#### The Tannic Acid-Silver Nitrate Treatment

In 1935, Bettman<sup>3,4</sup> introduced the tannic acid-silver nitrate treatment of burns. He believed that while the tannic acid treatment of Davidson was the height of advancement in the treatment of burns, it was not entirely satisfactory because

1. It takes the solid coagulum of tannic acid hours to form, while with silver nitrate added, it takes minutes.

2. As the coagulum slowly forms, the loss of circulating body fluids continues, and this loss

must be made up by repeated administration of parenteral fluids, thereby disturbing the patient frequently. With tannic acid followed by silver nitrate, one thorough application of the medication is all that is necessary for a good solid coagulum to form, and the loss of body fluids is stopped immediately.

3. By preventing dehydration, shock is minimized, and this tends to carry the patient safely through the most critical period, the first twenty-four hours following a serious burn.

This treatment is used to a great extent in the children's surgical division and Hedin<sup>12</sup> used this treatment in eighty-two consecutive cases with six deaths (a mortality rate of 7.3 per cent).

To effect a good result with this treatment, all grease and oil must be removed. This is accomplished by benzine. The burns are then dried by an electric dryer. Then, under strict asepsis, and with the patient on sterile sheets, a 5 per cent tannic acid solution is sprayed on by means of an atomizer. Immediately following the single spray, silver nitrate in 10 per cent solution is applied to the surface by means of cotton pledges. The formation of a crust is accomplished in a few minutes and the crust is a flexible one. The patient is placed under a heat cradle. Fluids are forced orally and parenterally. Blood transfusion is given routinely.

If the crust becomes loose it is removed. Unhealed areas are treated by the application of oxyquinoline sulfate (scarlet red) as suggested by Bettman.<sup>4</sup>

The cases in which this treatment was used were severe second and third degree burns. Since January, 1938, we have treated 220 burns by this method. There were nineteen deaths (a mortality of 8.6 per cent). Of the 220, only eighteen became infected. Our records show that the period of hospitalization with this treatment is definitely shorter than that of patients treated by other methods. We also noted that the amount of scarring and deformity is reduced to a minimum by this treatment.

#### The Methyl Rosaniline-Silver Nitrate Treatment

In 1937, Branch<sup>6</sup> introduced the methyl rosaniline-silver nitrate treatment of burns. He used a 10 per cent solution of silver nitrate, which acts on the proteins of the burned area, to immediately lay down a milky white coagulum. This took

the place of tannic acid in coagulating the proteins and preventing fluid loss. The methyl rosaniline stained this coagulum violet and aided in destroying and preventing infection.

After the application of the methyl rosaniline which is sprayed on in 1 per cent solution, the patient is placed under a heat cradle. The patient is resprayed five times at fifteen-minute intervals. If necessary, the spray is used once or twice daily following the initial treatment. If any coagulum remains at the end of two weeks, it is soaked off by the warm sodium bicarbonate bath. When the crusts are soaked off, epithelial islands are present in many of the cases. Scarlet red ointment is then applied.

Skin grafts were not needed in any of the cases on which this treatment was used. We used this treatment in twenty-six cases of second degree burns of the extremities. There were no deaths and only two became infected.

#### The Cod Liver Oil Treatment

Steel<sup>14</sup> of England found that crude cod liver oil, when used from the beginning of the treatment on burns, caused speedy recovery and it transformed indolent areas into healthy granulations.

We used this treatment on thirty-eight cases of first and second degree burns. These burns were not very extensive. The crude cod liver oil was applied after the burns were debrided and cleansed with warm boric acid solution. In the first degree burns, healing was fast, and the results were gratifying, but on the second degree burns, of which there were twenty-six, eight became infected, and in a large number, healing was delayed. A disadvantage of this treatment is the persistent presence of the fish odor about the patient. There were no deaths with this treatment.

#### Treatment of Severely Contaminated Burns and Those Over Ten to Twelve Hours Old

It is a rule in the Children's Surgical Division to treat burns which are ten to twelve hours old, or those severely contaminated with greases, oils, and dirty clothing, so that infection is assured, with moist saline dressings, or moist boric acid dressings. This establishes drainage and cleans the burned area. These dressings are changed three to four times daily and the burn is washed at each changing with white soap.

## MODERN TREATMENT OF BURNS—MEYER AND WILKEY

In many cases Xeroform\* strips are used. These are strips of gauze treated with sterile vaseline containing 3 per cent Xeroform. These strips are changed daily. The burns are cleansed at each changing with boric acid and white soap. The strips are covered by sterile dressings and a sea sponge is placed over these dressings so that the burn only will receive the benefit of the dressing. This is done to prevent maceration of the surrounding healthy skin. The sponge is held in place by a binder. The sponge pressure is also useful in preventing the formation of excess granulation tissue.

We used this treatment in 186 cases with two deaths (a mortality rate of about 0.6 of 1 per cent). With this treatment the period of hospitalization is definitely much longer than that with other treatments, but the morbidity and mortality rates are much lower. The scarring and deformity are not of a high degree.

We have also used Amertan† on many first degree burns and some second degree burns. The results were satisfactory in that infection was not commonly seen with this drug and healing seemed to be quite rapid.

### General Care of Burn Patients

At this point we must stress the importance of adequate nursing care. The outlook for a burn patient, like that of a patient following a major surgical procedure is dependent, in a great part, on the nursing care. She must see that the fluid intake is maintained, that the patient is comfortable and has adequate rest. The dressings are kept clean so that infection can be minimized.

Daily urine examinations are made on all burn patients. Blood chemistry examinations are made twice weekly to determine the blood chloride content and kidney function.

If, in spite of all precautions, infection develops, and it does in some, the patient is placed in a clean tub of warm water with sodium bicarbonate added. This is a daily procedure. Moist boric acid or saline dressings are then applied following the suggestion of Blair and Brown<sup>5</sup> who stated that these dressings arouse the resisting and fighting forces of the neighboring tissues, alleviate pain, and promote drainage. These dressings are moistened frequently, but not ex-

cessively so that they do not dry in place. Excessive moisture causes maceration of the surrounding tissues.

Excessive granulation is combated by the use of adhesive strips placed across the burn.

Nourishing food and tonics are given to all patients, and if the response of the patient is not as quick as expected, a blood transfusion is given to speed up the powers of healing and hasten recovery.

Skin grafts are done frequently when indicated. The burns are grafted early if the surfaces are clean and suitable for a graft.

### Summary and Conclusions

1. The morbidity and mortality of burns are definitely determined by: (1) the absorption of a toxin or toxic substance from the site of the burn; (2) the loss of body fluids; (3) infection; or (4) by a combination of these factors.

2. The initial shock must be treated by proper methods as soon as a burn patient is seen. This is as important as the local treatment of the burn.

3. Blood transfusion is of great value in severe burns.

4. We believe that the Bettman tannic acid-silver nitrate treatment is the treatment of choice in severe burns not contaminated or infected, especially if the patient is seen in less than twelve hours after the burn occurred.

5. The aniline dye treatment has been quite successful in our hands where infection is imminent.

6. In severely contaminated burns, moist saline dressings and cleansing with white soap is the treatment of choice.

7. Rigid asepsis must be maintained in the treatment of all burns.

8. If infection occurs, in spite of precautions, the patient is given daily sodium bicarbonate baths and moist saline dressings are applied.

9. Good nursing care is of the utmost importance.

### Bibliography

1. Aldrich, R. H.: Role of infection in burns, theory and treatment with special reference to gentian violet. *New Eng. Jour. Med.*, 208:299-309, (Feb. 9) 1933.
2. Aldrich, R. H.: Treatment of burns with a compound of aniline dyes. *New Eng. Jour. Med.*, 217:911-914, (Dec.) 1937.
3. Bettman, A. G.: The tannic acid-silver nitrate treatment of burns. *Northwest Med.*, 34:46-51, (Feb.) 1935.
4. Bettman, A. G.: The rationale of the tannic acid-silver nitrate treatment of burns. *Jour. Am. Med. Assn.*, 108:1490-1494 (May) 1937.
5. Blair, V. P., and Brown, J. B.: Use and uses of large split skin grafts of immediate thickness. *Surg., Gynec. and Obst.*, 49:82-97, (July) 1929.

\*Tri-bromphenol plus bismuth.

†A 5 per cent tannic acid plus 1:5000 merthiolate in a jelly base.

## CASE REPORT

6. Branch, H. E.: Extensive burns, treatment with silver nitrate and methyl rosaniline. *Arch. Surg.*, 35:478, (Sept.) 1937.
7. Davidson, E. C.: Tannic acid treatment of burns. *Surg., Gynec., and Obst.*, 41:202-211, (Aug.) 1935.
8. Hedin, R. F.: The immediate and subsequent treatment of burns. *Minnesota Med.*, 21:229, (April) 1938.
9. Kapsinow, R.: Rate of absorption from extensive superficial burns. *New Orleans Med. and Surg. Jour.*, 85:597-599, (Feb.) 1933.
10. Koch, Sumner L.: From the Children's Surgical Division.
11. Lueck, A. M.: Personal communication. Children's Surgical Division.
12. Rosenthal, S. R.: The toxin of burns. *Ann. Surg.*, 106: 111-117, (July) 1937.
13. Rosenthal, S. R.: Neutralization of histamine and burn toxin. *Ann. Surg.*, 106:257-265, (Aug.) 1937.
14. Steel, J. P.: Cod liver oil treatment of wounds. *Lancet*, 2:291, (Aug. 10) 1935.
15. Underhill, F. P., Carrington, G. L., Kapsinow, R., and Pack, G. T.: Blood concentration changes in extensive superficial burns and their significance for systemic treatment. *Arch. Int. Med.*, 32:31-49, (July) 1923.
16. Wells, D. B.: The aseptic tannic acid treatment of diffuse superficial burns. *Jour. Am. Med. Assn.*, 101:1136-1138, (Oct. 7) 1933.

## CASE REPORT

### SUPPURATIVE PAROTITIS AS A COMPLICATION OF MUMPS

EVERETT C. PERLMAN, M.D.  
Minneapolis, Minnesota

IN MOST of the current textbooks of medicine, pediatrics or contagious diseases, little mention is made of suppuration in the parotid gland as a complication of acute epidemic parotitis. Differential diagnosis between the epidemic and the suppurative types is very definite and suggests to the reader that one never occurs with the other. Suppurative parotitis occurs, more than rarely, as a sequel to operative procedures, notably those for suppurative abdominal conditions, and also as a sequel to certain infectious diseases such as typhoid fever, scarlet fever, diphtheria, and pneumonia. Those following surgical procedures are attributed by Berndt<sup>1</sup> to general dehydration from vomiting, reflex diminution of the salivary secretion from the anesthetic and from surgical manipulation, as well as from actual trauma to the gland by unskilled anesthetists. Those occurring as complications of infectious diseases are due to a locus minoris resistititia rather than to a metastatic invasion of the gland, except in the case of typhoid fever, wherein the typhoid organism has been recovered from the infected glands. Various other factors in the incidence of this complication have been well reviewed by Lewis.<sup>2</sup>

That suppurative parotitis does occur as a complication of epidemic mumps, although rarely, seems evident in a few case reports scattered through the literature. It is therefore necessary to report this case, to the end that other similar cases may be recognized. In 1920 and 1921, Bernstein<sup>3</sup> saw three such cases in the School-Polyclinic, Odessa, all of which terminated by spontaneous rupture of the abscess into the external auditory canal. He thought that the tendency to abscess formation was enhanced by the marked exhaustion and the deficient oral hygiene of the children during the blockade and the typhus epidemic of those years. Alexander<sup>4</sup> also reported such a case in 1927 with a similar spontaneous rupture into the external auditory canal. Bader,<sup>5</sup> in 1931, reported a case of acute suppurative parotitis as a complication of mumps, with rupture into the canal, but this swelling was secondary to an otitis media of three weeks' duration.

#### Case Report

D. F., female, aged eleven, had a past history which was essentially negative with the exception of pertussis at six months and rubeola at four years. On February 26, 1938, the patient came into her home after play, with a swelling in the left parotid region, and announced to her mother that she had mumps. Several children, playmates, had had the same infection during the past few weeks. She complained of nothing else, and was not ill enough to be confined to bed. The swelling disappeared gradually during the next four days.

On the evening of the fourth day she complained of dizziness. She went to bed, slept all night and awoke the next morning feeling well. In the afternoon she complained of pain in the right cheek. Her mother noticed that there was a swelling on this side of the face and that the child had a fever. That night she complained a great deal of pain in the ear and cheek and slept poorly. The next morning she was seen by a physician who told her that she had mumps. She was seen by the writer that evening and at that time she had a marked swelling over the right parotid gland with exquisite tenderness over the gland, under the jaw, and extending around to the right ear. There was no tenderness over the mastoid, but marked trismus was present. On slight pressure over the gland a thick yellow, purulent material escaped from Steno's duct. Her temperature at this time was 103.8 by mouth, and her pulse rate was 128. The right ear drum was not visible because of the swelling in the canal from pressure of the swollen gland. The orifice of Steno's duct on the left side also was swollen and surrounded by a red areola, but no pus was expressed. She was given supportive treatment at home and when seen, two days later, there was definite evidence of extensive suppuration in the gland, with an area of beginning fluctuation inferior to the helix of the right ear. Purulent material continued to exude from Steno's duct during all of this time. The next morning there was a spontaneous rupture of the abscess into the anterior wall of the external auditory canal, with profuse discharge of purulent material from the ear canal. There was also, by this time, definite fluctuation of the abscess below the ear. The temperature, by mouth, varied each day from 101 to 102.5.

At this time the patient was transferred to a hospital where the fluctuant area was treated with very small hot packs for twenty-four hours in order to localize the suppuration, and then it was incised. The incision,

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## MEDICINE IN WASHINGTON AND CHISAGO COUNTIES

(Continued from August issue.)

Besides their practice, the physicians found plenty of other things to do. In 1880 Dr. A. J. Murdock was elected treasurer of the Union of the Towns of the St. Croix Valley, secretary of the Chisago County Bible Society, and (in December) president of the town council. Dr. Millard was Washington county physician; Drs. Weiseman, Hallberg and Olding sold liquor (unfortunately without licenses), which caused them to be arrested. Dr. Comfort was for many years editor of a *Thompsonian Medical Journal*. Where and when this journal was published is unknown. In 1881 the office of Washington county physician passed to Dr. Caine. Dr. T. C. Clark was Stillwater city physician, and Dr. Millard took a long and very interesting trip abroad. Dr. Hallberg was physician for the Scandinavian Relief Association, a position he held for several years. Dr. A. J. Murdock served on the Board of Education, and was second vice president of the State Medical Association. In 1882 Dr. Olding ran a mercantile business. Drs. Murdock, Fliesburg and McComb shared the position of Chisago county physician, while Dr. Pratt was made county physician of Washington county, despite much opposition from the local homeopaths. Upon his return from abroad in June, Millard was elected president of the State Medical Association. Clark served as deputy coroner. Edgerton ran an eye and ear infirmary; Gaskill owned and managed a drug store. Zuercher proved his versatility by winning a \$100 prize with a poem he had written. In 1883 Caine was elected one of the censors at a homeopathic convention. Watier was one of the incorporators of "Le Canadian" publishing company of St. Paul. Murdock was again president of the council of Taylors Falls, Millard was a member of the first State Board of Medical Examiners, and Umland was appointed county commissioner in the place of McComb, who had left for Duluth.

In 1884 Umland was nominated for the state legislature and Caine was reappointed surgeon for the Milwaukee road. Pratt was second vice president of the State Medical Association, as well as prison physician and member of the state legislature. Jenner left in February for a year's study in the hospitals of Berlin and Paris, and Watier turned from his publishing business to the job of running a drug store. At least two of the physicians had very interesting hobbies: Hodgkinson collected old medical books and owned a large library, and Umland was a very talented musician. In 1885 Caine was a delegate to the national homeopathic convention, and secretary of the association of sergeants of the first regiment. Merrill became county physician; Gaskill moved to South Stillwater and opened a drug store there, while McGuire opened one at North Branch. Among the pastimes which the doctors enjoyed was hunting, especially Umland, who got the first and finest buck of the season. Cooley, who at this time lived in South Stillwater, amused himself by constructing a large astronomical telescope, seven feet long, with a five and a half inch lens. He also made magic lantern outfits which he sold for \$150 each. Apparently some one of the physicians who was in Stillwater at this time was a pretty good story teller, for in the *Stillwater Messenger* of September 30, 1882, appeared the following hoax:

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"A physician of this city, whose name we are not at liberty to divulge, was one of a party of four students in the medical college from which he graduated who had shoes made from the skin of human beings which they purchased of dealers for dissection. His pair were made from the skin of a young lady eighteen years of age, and lasted him a year. The leather took a handsome polish, was very soft, but did not keep out the weather. . . ."

An unusual event, which deserves to be mentioned here, was the reception at Stillwater tendered the delegates of the American Medical Association on June 9, 1882. The convention that year was at Saint Paul, but all the delegates were invited to spend the day at Stillwater, at the home of Hon. and Mrs. Sabin. The guests were variously estimated at from seven hundred to over a thousand; they filled sixteen coaches. Three steamers—the Jennie Hays, the G. M. Knapp and the Sam Atlee—had been chartered, and the guests were given an excursion on the river. They then returned to the Sabin residence, where a grand dinner awaited them. The grounds were beautifully illuminated with Japanese lanterns; incidentally, upon this occasion electric lights were first used in the valley. A ladies' committee of arrangements waited on the guests. After the feast Dr. Millard called the meeting to order and Judge Murdock made the address of welcome. The delegates stayed until a late hour before returning to Saint Paul, and all declared they had never had a finer time.

Probably under the impetus of this meeting, another local medical society was formed. It was better organized than the preceding ones, and its constitution and the minutes of its meetings have been preserved. The first meeting was held May 31, 1882; officers were elected, consisting of W. H. Pratt, president; Carli, vice president; T. C. Clark, secretary; W. Jenner, treasurer, and Carli delegate to the State Association. The constitution was signed by P. H. Millard, C. B. Marshall, W. C. Voigt, O. A. Watier, T. C. Clark, B. J. Merrill, E. R. Jellison, W. H. Pratt and D. W. Jenner. Drs. J. R. M. Gaskill, A. H. Steen and J. C. Rhodes were elected members. The name chosen was the Washington County Medical Society. The next meeting was held some time later, on January 19, 1884, and officers were again elected. This time Pratt was president, Merrill vice president, Clark secretary, and Voigt treasurer. Censors were appointed by the president, and motion was made and carried that Pratt act as a committee of one to see that the "State Medical Act be complied with in the county, and to enter any necessary complaints before the State Examining Board." From this time on, meetings were held irregularly until the summer of 1885. Several papers were read by the members, and discussions were held on various subjects. After this society became defunct, another was formed, the Stillwater Medical Society. There are no records of its membership or meetings, and apparently it was chiefly a social organization. After this, there were no other local societies until 1902, at which time the present Washington County Medical Society was formed. This society has functioned, with only a few brief periods of inactivity, until the present time.

By the middle of the eighties many of the early pioneers had left the valley or had died. Dr. A. J. Murdock had moved to Saint Paul following the death of his father, Dr. Thaddeus Murdock. Dr. Comfort died in 1881; little is recorded of his history, but he had lived and practiced in Wyoming, Chisago county, for over thirty years. In March, 1884, Dr. Olding, who had also lived in Chisago county for many years, was found dead one morning in his bed. Dr. E. D. Whiting, another of the pioneers, died in 1882, after suffering for six months from a softening of the brain, and in 1885 Dr. Otis Hoyt died at his home in Hudson. Hoyt and Carli had often joked about which would attend the other's funeral, and

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the margin was not a very wide one, for a little over two years later Carli also died. At the time of his death he was the oldest inhabitant of the city. There remained of the early pioneers only Rhodes and Gaskill.

The places left by these men were filled by a large number of new arrivals. A great many physicians came during the last fifteen years of the century, most of whom stayed only a short time, though some are still practicing in the valley. In 1887, when another medical practice act was passed by the state legislature, affidavits were signed by Drs. Maisch, Cooney, and Coats, stating that they were practicing in Woodbury, Afton, and St. Paul Park, respectively. The same year a Dr. F. H. Mitchell practiced for a while in Stillwater and St. Paul Park. A Dr. Frelich settled at Stillwater and Dr. Thomas Zein at Rush City, both of whom remained several years. In 1888 there were no new arrivals, but in 1889 Dr. S. O. Francis moved to White Bear, Dr. Oscar F. Thomas to Lakeland, Dr. George A. Carpenter to Marine, and Drs. C. M. Lee and A. J. Howe (or Stowe) to somewhere in Chisago county. A Dr. E. Carleys practiced at South Stillwater, Dr. Philip Muller returned to practice for a while in Stillwater, and Dr. E. Y. Arnold settled at St. Croix Falls. Although he resided in Wisconsin, Dr. Arnold had many patients in Taylors Falls and its vicinity. Many of the physicians practiced on both sides of the river, in both states.

In 1890 the Official Register of Physicians listed the following other physicians in Washington county: George G. Barnett of Lakeland, H. L. Brynildson of Vasa, Arthur De Voe, Albert Fenner, C. E. Hoveland, Julia M. Jacobson, James G. McCoy, Mary Reis Melindy, Leonard F. Pitkin, James Sinclair, and Eindred Viks, all of Stillwater, and Andrew Soderlind of Marine Mills. Directories of that year added E. M. Lundholm, N. Amherst Nelson and Lemuel P. Wetherby of Stillwater, and C. R. Keyes, who was hospital steward at the state prison at this time. Besides these, four midwives offered their services to the Stillwater public: Ursula Bauman, Mrs. Henry Hagen, Annie Tobisch, and Mrs. Cornelia Tozendine.

In 1891 F. Van Waters practiced in Stillwater, W. O. Tessier at Franconia, J. G. Erickson at Marine, and W. S. Fullerton at Rush City in Chisago county. In 1892 a Dr. Wilbur was mentioned as having a patient in the Stillwater hospital. In 1893 Dr. F. H. Hall served as steward at the prison hospital until he was obliged to resign to care for his wife, who had contracted typhoid fever, and in June, 1894, his place was filled by Dr. E. Sidney Boleyn, from Minneapolis. After holding this office for a year, Dr. Boleyn resigned also, but remained in Stillwater, where he is still practicing today. Several other newcomers also made their appearance in 1894: Drs. S. O. Watkins, E. P. Ryan and Joseph Legault of Stillwater, J. F. Gemmel of Rush City, and E. E. Krogstad (or Krogblod) of somewhere in Chisago county. In 1895 A. J. Teiten practiced at Harris, Daniel G. Beebe was steward at the prison hospital, and J. G. Erickson settled at Lindstrom—probably the same Dr. Erickson who had been at Marine a few years earlier. In 1896 four new physicians were reported to be practicing in the two counties: F. J. Bedard and E. A. Edholm of Stillwater, C. L. Clark of White Bear and R. W. Getty of North Branch. In 1897 G. N. Watier, F. G. Landeen, J. H. Haines and a Dr. Lenox moved to Stillwater. Dr. M. E. Withrow arrived to fill the again vacant post of prison hospital steward. In 1898 came Drs. J. W. Rulien, C. M. Anderson and E. S. Fowler, all of whom practiced in Chisago County for several years, and F. L. Puffer, who lived on Bird Island. There were no new arrivals in 1899, but in 1900 Drs. P. C. Bjorneby and A. Lyon settled somewhere in Chisago county, and Dr. E. A. Riley at Willow River.

These, then, were the physicians who practiced in the two counties up to 1900.

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Probably there were others whose names are not recorded, and certainly many of those listed are forgotten, since most of them stayed only a year or so. However, each one must have added something to the welfare and the history of the county in which he lived.

In the last fifteen years of the century there were few epidemics or diseases of much historical interest. This was probably due to the activities of the boards of health, which worked under the guidance of Dr. Merrill and several other physicians. In Stillwater the first of a series of thorough sanitary inspections was begun in 1885, which must have been quite an undertaking. Dr. Merrill's description, in the board's report, is interesting. "A house to house inspection," he wrote, "was begun as early as the weather permitted, and continued two months. The citizens in general were helpful, though others were arrested and brought before the municipal court. Thousands of loads of garbage and contents of privy vaults were taken from every part of the city to the dumping grounds. The city never underwent such a general cleaning before. The death rate has gone down in a remarkable manner (only one death from acute disease among 16,000 people in the month of June) and the health of our community is second to no other city or section in the entire country."

However, the best of cleaning could not have remedied for long the condition of the town, for the report continues: "The city is practically without sewerage, except that which its hilly conformation provides. Instead of the constant and efficient drain of a sewer, the householder is obliged to resort to the sluggish and terribly inefficient soil about his dwelling for the deposit of his slops and their drainage. This absence of systematic drainage has greatly impeded the work of the Health Board. We need some method for the daily removal of garbage, kitchen refuse and night soil, especially in the hot months, to complete our system of keeping clean. We also need a permanent sanitary inspector."

It seems amazing that a city over forty years old and as large as Stillwater was at that time had gone without these things for so many years, but it must be remembered that it grew so quickly and spontaneously that it was a large city before anyone had time to plan such a thing as a sewerage system, and, of course, people became accustomed to the lack of one. At that time cleanliness and health were not as closely associated in the average mind as they are today. These conditions were all later remedied, and until then the annual clean-ups were well conducted.

In 1888 Rush City followed Stillwater's example by having a sanitary inspection and general clean-up. Dr. Zein, the health officer, reported in the "Public Health": "During the past year the board of health has found it necessary to urge a lot of cleaning up; citizens generally were very helpful but we need a lot of cleaning. There was slight cause to resort to legal means. . . . The past year has been an unusual one for sickness and death. Diphtheria is a constant dread and a persistent visitor, and in a very malignant form; it seems to defy all attempts of the board to stop it. It has, in the past year, visited twenty-one families in the valley, all of whom have been quarantined. There have been fifty-three cases and twenty deaths, ten male, ten female, the youngest three years seven months old, the eldest twenty-one years three months."

"The Board has spent four hundred dollars cleaning up the village of nuisances, sources of filth and causes of disease, in maintaining quarantine and furnishing nurses and disinfectants for the poor." He added that slaughter houses required much attention, and concluded that the village was, finally, in good sanitary condition.

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Despite the improving conditions, disease was still prevalent. In 1885 epidemics of scarlatina were reported at South Stillwater and diphtheria at Franconia and Schafer. In 1887 more complete reports show that in Washington County there were six deaths from measles, five from scarlatina, fourteen from croup, nineteen from diphtheria, thirteen from typhoid, eighteen from diarrheal diseases of infancy, twenty-four from phthisis, five from bronchitis and twenty from pneumonia. Chisago county, that same year, had one death from measles, eighteen from diphtheria, five from typhoid, twelve from diarrheal diseases of infancy, twelve from phthisis, three from bronchitis and eight from pneumonia. In 1889 the only epidemic of interest in Chisago county was a mild outbreak of scarlet fever at Taylors Falls. In Washington county the health officer reported that the city had an unusually healthy year; the drinking water was good, the city was kept cleaner than ever before, and the citizens were "becoming habituated to the notion of cleaning up at least once a year." Possibly the citizens were a little too satisfied with their work, for in July a sanitary conference which had been planned nearly fell through because of public apathy and lack of interest; only the exertions of the clergy and the vigorous comments of the mayor finally made it a success. The report continues that a sewerage system had been started but should be extended, and some means of dealing with kitchen refuse was still needed. However, the quarantine system was well developed.

Another item of interest in 1890 was the discovery of a leper in Rush City. One had been found nine years before in Washington county by Dr. Caine, but this was the first to be reported in Chisago county. It was discovered by Consul Christenson and identified by Dr. Gronvald. Both of these patients were Scandinavians. In the last decade of the century there were no serious epidemics reported, nor any particularly interesting diseases in either county.

Even in the state prison conditions were much improved, though still rather far from a modern conception of perfection. Arrangements were made for clean water, meals were eaten outside of the cells, new cells were built to relieve crowding, zinc night-buckets replaced the old wooden ones, and a sewer was constructed. The prison hospital was enlarged, and the use of antiseptics was introduced, and a graduate physician employed as hospital steward. A laboratory with a microscope and other instruments necessary for physical and chemical analysis was instilled, and a medical library was begun. All prisoners were given a thorough physical examination upon entering, and contagious diseases were isolated. These reforms were not introduced until 1893. Tuberculous prisoners were put in a separate wing. All of these changes were brought in slowly over a period of many years after much urging by the prison physicians, wardens, and various boards. That the city and village lockups could use some similar reforms was shown by a report made in 1890 by the secretary of the State Board of Corrections and Charities. The secretary had sent out a questionnaire which asked, among other things, what sort of beds and bedding were provided, and how often this bedding was washed and the lockup scrubbed. Marine Mills and North Branch performed both duties twice a year, White Bear and Franconia when needed, and Rush City, Stillwater and Taylors Falls made no report. Two other towns in the state replied once in ten years and never.

Besides attending to their practice most of the physicians served the community in some official capacity. Drs. H. G. Murdock, Stowe, Krogstad, Gemmel, Teitin, Rulien, Anderson, Fowler, Werner, Erickson, Zein, Bjorneby, Lyon and Robb all served as Chisago county physician at one time or another, while Dr. T. C. Clark held the same office in Washington county. Drs. Robb, Erickson and H. G.

## HISTORY OF MEDICINE IN MINNESOTA

Murdock served as coroners. Dr. Voight was city health inspector of Stillwater, and Drs. Cooley, Merrill, Fliesburg and Zein were health officers of South Stillwater, Stillwater, Fish Lake and Rush City, respectively. Dr. Merrill was also prison physician for a time, as was Dr. Pratt. Physicians who served as stewards in the prison hospital included Drs. Keyes, Hall, Boleyn, Beebe and Withrow. Dr. Keyes also made a study of cestodes, which was printed in the *Transactions of the State Medical Association* for 1890. Dr. George E. Clark was professor of homeopathy at the state university. Dr. T. C. Clark and Dr. Hallberg were both commissioners in the counties in which they lived. Dr. Marshall ran a drug store, and Dr. Watier manufactured a cough syrup. Several physicians travelled, Dr. Jellison going to China and Dr. Erickson to Sweden.

Dr. Beardsley was president of the village council of Rush City; Dr. Umland was appointed receiver of public monies at Taylors Falls, and later was postmaster at Fosston. Dr. H. G. Murdock was on the board of pension examiners, and at a meeting of the literary society he "entertained as soloist" though the nature of his solo was not described in the report of the meeting. The doctor was a "woodsman," and must have been quite a fisherman, too, for a news item in 1895 credits him with a morning's catch of two hundred trout. Dr. Caine, in 1894, had the honor of being mentioned as candidate for the office of Grand Exalted Ruler of the Elks, and the same year Dr. Mitchell, then of St. Paul Park, had the "honor" of a coat of red paint and feathers from the citizens of that town. Many of the physicians took an active part in the State Medical Association. Dr. McComb, then a resident of Duluth, was president in 1887, Drs. Rhodes and Stone served many years as censors, and Drs. Millard and Stone were delegates to the national convention. Dr. Merrill was essayist, his subject being "Medical Iconoclasm," and chairman of committees on finance, medical jurisprudence, legislation, and medical education. Dr. Pratt was also very active on many committees, and Dr. Millard's services are too well known to be repeated.

The last fifteen years of the century saw the passing of the last links with the early pioneer days: the deaths of Drs. Hoyt and Carli in 1885 and 1887, and Dr. Gustaf Colins, of Franconia, in 1889. Dr. Colins was over eighty years of age and according to his obituary had practiced for over forty years in the county, and was one of its oldest settlers. The obituary explains that he "had a natural gift for surgery, and was called the 'handy man' in that connection, being noted in his way for operations. He had no instruction, but always attended to dislocations and broken limbs without charge, even during his old age when he sometimes made mistakes." In 1891 the valley suffered the rather more serious loss of Dr. O. A. Watier of Stillwater. In April, 1894, Dr. J. R. M. Gaskill died at Danville, Ill., from the effects of poison administered in his coffee, evidently by accident. Several other persons in the same hotel were made very sick, but the doctor was the only one to die, probably due to the fact that, being fond of coffee, he drank more than the others, and also because he was in poor health at the time because of a recent operation. Three years later Dr. C. B. Marshall, who had practiced for many years in Stillwater, died following an operation for appendicitis, and in 1900 Dr. Umland also passed away, at Fosston, Minn. Umland had spent much of his time in the valley, though he had moved away some time before his death. One other event which should be mentioned was the passing of Dr. J. C. Rhodes. He was one of the earliest and the most prominent physicians in the valley, and the time of his death, in May, 1903, is an appropriate place to end this history of medicine in the St. Croix valley. The last of the pioneer physicians was gone, and the new century was on its way.

*(To be continued in the October issue)*

## EDITORIAL

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#### BUSINESS MANAGER

J. R. BRUCE

Volume 21 SEPTEMBER, 1938 Number 9

#### Group Hospital Association, Inc.

IF THE contemplated grand jury investigation of the District of Columbia Medical Society instigated by Assistant Attorney General Arnold materializes, the trial will hinge on whether the local medical society had grounds for expelling a member for accepting employment from the Group Health Association, Inc.

There should be no question of the right of a medical society to determine its own membership. From a practical standpoint, it is a simple matter for a society to decline election to membership. On the other hand, a physician already a member suffers injury by being expelled and generally cannot be expelled without cause. Was employment by the Group Health Association

sufficient cause for expulsion from the District of Columbia Medical Society?

The Group Health Association filed articles of incorporation at Washington, February 24, 1937. It provided for medical and hospital care for any employe of the Federal government (the army and navy excepted) for \$26.40 per year for a single person or \$39.60 for a married person or one with dependents. Although really an insurance company, it was filed under the heading of benevolent, charitable, educational, literary, musical, scientific, religious and missionary organizations. The source of the capital necessary to launch the Association was, for a time, obscure. Eventually it became known that the Home Owners Loan Corporation had appropriated \$40,000, which appropriation was approved by the Legislative Council of the Senate in February, 1938, and by the House Appropriations Committee, which, however, stated that it was the Committee's unanimous opinion that the expenditure was not authorized by law. The United States District Attorney for the District of Columbia has held that the Association is engaged unlawfully in the practice of medicine, and the insurance commissioner that it is unlawfully carrying on the business of insurance.

It would seem that the case for the District of Columbia Medical Society is rather strong.

The Group Hospital Association, Inc., threatens to entirely disrupt private practice in the District of Columbia. Incorporated to give medical and hospital care to Federal employees, who number about 840,000, and with their dependents some 2,500,000, irrespective of income, the effect on medical practice in Washington, D. C., particularly, is evident. So far its membership, we understand, has been limited to employes of the Home Owners Loan Corporation, a government agency.

Newspaper comment has been made to the effect that organized medicine has made a mistake in opposing a new method of meeting medical bills. Was the District of Columbia Medical Society to sit idly by and ignore an organization which threatened to annihilate private practice and which the society had good reason to believe would furnish inferior medical care to

## EDITORIAL

its members? The Association had little experience whereby it could estimate membership fees and the medical staff required. The undertaking abolished any choice on the part of members as to medical adviser. Knowing the preference for doctors of their own choice manifest by most Americans, we wonder how the membership has reacted to the set-up.

Desirable as the equal distribution of the cost of sickness is, the Group Hospital Association, Inc., is a good example of just the form of group medicine which most doctors oppose. The Association has been backed by the Government, and presumably any deficits will be paid by taxpayers; free choice of medical advisers does not exist; membership is not restricted to the low income group, and in all probability the medical care offered will be of an inferior quality.

Has it come to the point where the Government can dictate the membership of a medical society when the activities of a member are disapproved by the society but approved by the Government? We think the Department of Justice has made a poor selection as a test case and that the Department has work cut out for it in the case of the Group Hospital Association, Inc.

### Recommendations of the National Health Conference

THE National Health Conference, held in Washington in July, supposedly to discuss ways and means to meet the medical needs of the country, resulted in the recommendation by the technical committee of the Federal Government, that 850 million dollars be appropriated yearly for the next ten years, half by the Federal Government and half by the states, for what, in the opinion of the Committee, are much needed medical activities. These include an expansion of public health activities to the amount of 200 million yearly to combat tuberculosis, venereal disease, malaria, pneumonia, cancer and mental disease; 165 million for more maternal and child health service, to include the provision of medical and nursing care of mothers and newborn infants, medical care of children, services for crippled children, consultation services of specialists, and postgraduate training (for all income groups); 146 million for

building more hospitals to provide 360,000 more hospital beds and 500 health and diagnostic centers; 400 million to provide medical care for the medically needy.

There is evidence in the proposed huge appropriation of nearly a billion dollars a year, half in the form of a Federal subsidy to the states, of entrance to a much greater degree by the Federal Government into activities heretofore conducted largely by the states themselves, and in addition provision for payment of medical bills for those considered medically needy and apparently in certain instances for those in the higher income brackets.

In considering the need for any such appropriation, it is interesting to note that, except for the years of the influenza epidemic, each year for the past twenty-five years has shown a reduction in the mortality rate of the country which has continued into 1938. Recent statistics published by the Metropolitan Life Insurance Company show that the death rate for the first six months of 1938 is much below that of any previous like period. Further, the recent survey of the Council on Medical Education and Hospitals of the American Medical Association shows that 98.5 per cent of our citizens live within thirty miles of a hospital. While there is doubtless need in certain areas for medical aid, no evidence has come to our attention of any general medical need not at present supplied.

Whether Congress will make this enormous appropriation is perhaps not problematic. Whether the states will appropriate dollar for dollar is, in the light of past experience, quite likely.

It should be remembered that this proposal comes at a time when some eleven million are unemployed, a situation which it is to be hoped and expected will not persist the next ten years.

Minnesota's need for the expenditure of several millions along the proposed lines is not apparent. There is no doubt but that the state would have to go further into debt to raise its share of the sum. It is to be hoped the state legislature will be able to resist the temptation to accept Federal subsidy for this great increase in government medical activity.

Aside from the question of whether Federal and State governments can afford such a great increase in appropriations of this sort, desirable

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as they may be for certain scattered localities, the question resolves itself into what type of government we are developing in our country. What are the functions of the Federal government and what are distinctly those of the individual states? Is it the function of government to enter into competition with its citizens? Should private industry be called upon to make up deficits in government business activities? Do our citizens want government medical activities aside from those concerned with Public Health and medical care in general subject to politics? In short, do we want socialism?

The private practice of medicine is apparently about to receive another blow just as industry has received blow after blow from government intrusion. The wild appropriation of government funds, of which the proposal of the National Health Conference is another example, cannot go on indefinitely. It is to be hoped that our representatives will exert their prerogatives and call a halt before all government becomes bankrupt.

C. B. D.

### Tact Toward the Sick

WHEN one is laid up at home or in the hospital and is bored with existence, nothing is more welcome or of greater aid in convalescence than the visits of friends. To feel that one has friends who are interested in one's recovery is an urge to get well. And yet there are friends who are totally lacking in what is called "tact," who cannot limit their calls but stay on and on; others who through the association of ideas relate similar or dissimilar cases of illness in which the outcome was not so favorable, leaving the patient exhausted and depressed.

The acutely ill need special consideration. While a friend can be a friend indeed in helping organize the medical care in an emergency, a seriously ill person has no energy to spend on visitors. The attending physician should lay down the rule "no visitors" and in certain instances even the nearest relatives should be limited as to duration and frequency of visits. The persistence with which some so-called friends insist on seeing an acutely ill friend, ferreting out the hospital room and showing a lack of consideration for hospital rules, is astounding. Even a telephone call was recently

put through by an unwary hospital operator after bed-time, disturbing the patient's rest.

Sympathy is often due the wife of a man acutely ill in the hospital. Telephone calls keep her busier than a down-town central, and frequent and prolonged calls from solicitous friends only too often lead to exhaustion.

Even the attending physician deserves compassion at times when a patient with a large circle of friends happens to be acutely ill. During his moments of relaxation he is likely to be barraged with questions only serving to keep a subject already the source of much worry the more before his mind.

The obstetric patient should be mentioned. The long expected event has taken place and family and friends seem to think that mother and infant are eager to celebrate the occasion at once by holding a reception. Too often the inexperienced mother has this same attitude and the attending physician sometimes finds the recently delivered mother surrounded by relatives and friends who have long overstayed the proper time limit for such a visit, apparently awaiting the next nursing hour and a view of the newly arrived citizen-to-be. Nothing in hospital management has been harder to enforce than the exclusion of friends and relatives from the nursery of the hospital.

Then there is the hospital hound. A friend goes to the hospital and she (as is usually the case) trots down to the hospital and sits by the hour, often making several trips each day to keep posted on the progress of events. The more gruesome details she can learn the more a certain almost morbid pleasure is derived and the telephone wires are kept hot during spare moments with the latest bulletins.

There is one friend who should never be visited in the hospital. This is the type of neurotic woman who often with the connivance of a certain type of physician goes periodically to the hospital quite unnecessarily. With the room full of flowers and arrayed in her best and telephone at hand, she is prepared to greet the friends she has notified of her predicament.

After all, the matter of sick room visitors is of great importance to any patient and should receive the most thoughtful consideration on the part of the attending physician.

# MEDICAL ECONOMICS

Edited by the Committee on Medical Economics  
of the

Minnesota State Medical Association

W. F. Braasch, M.D., Chairman

## SURVEY LAGS

Form No. 1 for physicians, most important source of information for the Survey of Needs and Supply of Medical Care, is coming in very slowly.

From the response to a recent inquiry, it appears that no county in the state has yet been able to report a 100 per cent return. Only a few are able to report 50 per cent or over.

Furthermore, the meager returns thus far submitted by the secretaries show that questions seven and nine, most important of all for the purposes of this study, have been too frequently omitted altogether.

Secretaries should canvas their members immediately to spur laggards and secure as complete a return as possible.

Organized medicine has cast doubt upon the reliability of statistical studies used to back up the government program for increased health protection, building of hospitals and possible grants in aid for establishment of state systems of health insurance.

This Survey is acutely needed NOW to provide facts and figures upon which physicians may rely and upon which sound programs of improvement can be built. They are equally needed to prevent the foisting of elaborate and expensive services unnecessarily upon the American people.

Medicine is being challenged daily in the magazines, on the radio, in the newspapers.

A complete and reliable presentation of the facts through the Survey is the answer to that challenge.

in mind should be to arrive at conclusions which would be mutually agreeable.

## Cleverly Pre-arranged

Instead of a conference, a cleverly pre-arranged program was set up, with the sole objective of publicizing and supporting a program of health reform inspired by federal officials. Invited to the "conference" was a carefully selected group of some 150 individuals, most of whom were known because of their so-called liberal views toward medical care, and who had either written or spoken in behalf of these views. In the group were men and women with a wide assortment of occupations, including many social and welfare workers, magazine editors, newspaper men, and labor union representatives.

To give it an atmosphere of fairness, a small group of physicians representing the American Medical Association was invited. They were quite overwhelmed by the mass of hostile propaganda—and for all practical purposes, they might better have stayed at home. *Conspicuous by their absence were representatives of banking, investment activities, and of industry and manufacturing, who might have been interested in the financing of the vast expenditures involved.* Neither were there any economists or educators who had ever been guilty of entertaining any theories which might be called conservative or reactionary.

## Discussions Released in Advance

Much of the time scheduled for the program of the conference was spent in reading the report and recommendations of the governmental health forces. These had been typed previously and had been read and studied by some of the delegates present. They also had been released by previous arrangement for national newspaper publicity from day to day. The discussion which followed was largely pre-arranged and the remarks made by many of those who took part in

## IMPRESSIONS GAINED FROM THE RECENT NATIONAL HEALTH CONFERENCE IN WASHINGTON

IN THE first place the gathering in Washington was no conference at all—at least in the generally accepted meaning of that term. As I understand it, the term conference implies an attempt to arrive at a solution of some problem by a group of individuals who might have different opinions but who possess authoritative information concerning the subject in hand. The problem should have free and frank discussion from all sides in order to obtain as much information as possible, and the only objective

the discussion were also previously written and dated for publication.

For the most part those who were called upon to discuss the problem were sympathetic with the government program and in most cases urged that even more radical steps be taken.

#### Emotional Well-wishing

It is difficult to understand the psychology of many of those who were assembled in the conference. One fact stands out above everything else, however, and that is that when it comes to opinions regarding the care of health, many intelligent people base their ideas more on emotion than logic. One wonders how intelligent men and women could make statements which were largely without factual basis and governed purely by emotional well-wishing.

It was surprising as well as discouraging to hear well-meaning representatives of such supposedly well informed organizations as the Farm Bureau Federation, Parent-Teachers Association, General Federation of Women's Clubs, and League of Women Voters get up and urge various phases of health socialization without acquainting themselves with all phases of the problems involved. It is to be hoped that these splendid organizations, usually well informed and unbiased, will in the future get their information on matters of health from all sources, including that storehouse of information available at the headquarters of the American Medical Association.

#### Lay Confusion

One feature of much of the laymen's barrage was a curious confusion of the indigent with the low income groups. Apparently many of the lay speakers failed to realize the fundamental differences in the problems involved in their health supervision. They did not seem to know that the health of the indigent was supposed to be under municipal, state, or federal control. It was rather ironical to hear their outspoken criticism of the failure of government agencies to look after this group properly when governmental control was supposed to be the objective of their arguments.

#### Doctor Ridiculed

The physicians present were placed in a curious position. One almost felt like a social outcast in the group, and a guilty conspirator to block justice and progress. We were placed in

the role of selfish, narrow-minded individuals, having no vision or ability to sense reform and incapable of managing affairs of health as they should be managed. A jibe or sally at the unfortunate doctor was greeted with a round of laughter or applause. On the other hand, a calm statement showing what the physician or medical societies had already done and were trying to do to improve medical care received scant attention or was greeted with silence.

#### Sensational Publicity

Another feature of the conference was the sensational publicity of the proceedings by the daily press. Liberal space was given to the Federal Health program as released by the Inter-departmental Committee. Only the sensational features of the discussion were publicized, which were largely radical and in support of the proposed reforms. The remarks made by Dr. West and Dr. Abell, which stated that the medical profession was in sympathy with some features of the federal program, while others were regarded as objectionable, and their statements showing how much already had been accomplished by physicians along these lines, received only abbreviated notice in the press. The contribution of Dr. Cabot, in which he ridiculed the present methods of medical care, and the well merited rebuke by Dr. West, received more headlines than any other feature of the entire conference.

Unfortunately, the introductory remarks made by Dr. Cabot received but little notice but, in all fairness, should be repeated. Before reading his paper he spoke as follows: "I wish to have it distinctly understood that the views I hold in this controversy are my own and in no way represent the attitude of the Mayo Clinic." Instead of publicizing this statement, the newspapers gave the impression that Dr. Cabot spoke as a representative of the Clinic, which was quite contrary to the truth.

#### A Few Tricks of Their Own

It must be said that the skill with which the proponents of medical socialization have inoculated an increasing circle of the laity with their ideas is most impressive. They have learned all of the tricks practiced by other governmental activities marvelously well and added a few of their own. The way otherwise intelligent lay

## MEDICAL ECONOMICS

men mouthed the oft-repeated but incorrectly founded statements concerning lack of medical care is a startling illustration of what skillful propaganda can accomplish.

### Purpose

The purpose of the conference was discussed in the introductory remarks of Miss Josephine Roche, the able General Chairman of the Interdepartmental Committee. The federal program for medical reform was discussed in general terms by its progenitor, Dr. Parran, Surgeon General of the United States Public Health Service. His sententious remark to the effect that medical care promises to be the main issue, both political and social, before the American people in the immediate future would seem to give clear warning of the purpose of the government to invade the promising field of medical care, both therapeutic and preventive, and use it for any political advantage that it may possess. The report of the Technical Committee and the agenda of the conference have been published in detail in recent issues of the *Journal of the American Medical Association*. A synopsis of the recommendations made, with a few random comments, may be of interest.

### Program

The Technical Committee's study of health and medical services in the United States indicates that deficiencies in the present health services fall into four broad categories:

1. Preventive health services for the nation as a whole are grossly insufficient.
2. Hospital and other institutional facilities are inadequate in many communities, especially in rural areas, and financial support for hospital care and for professional services in hospitals is both insufficient and precarious, especially for services to people who cannot pay the costs of the care they need.
3. One-third of the population, including persons with or without income, is receiving inadequate or no medical service.
4. An even larger fraction of the population suffers from economic burdens created by illness.

The Committee submitted a program of five recommendations to meet these problems which are as follows:

#### I. Expansion of public health and maternal and child health services.

SEPTEMBER, 1938

A. Expansion of general public health services. It is recommended that Federal participation in the program of preventive health service should be increased and, furthermore, that Federal participation be increased to promote a frontal attack, to (1) eradicate tuberculosis, venereal disease and malaria; (2) control mortality from pneumonia and cancer; and (3) promote mental and industrial hygiene.

B. Expansion of maternal and child health services. This includes provisions for medical and nursing care of mothers and newborn infants; medical care of children; services for crippled children; consultation services of specialists; and more adequate provision for postgraduate training of professional personnel. It includes, also, recommendations for the establishment of numerous health and diagnostic centers for these purposes. The total cost of taking care of the recommendations under A. is estimated at \$200,000,000, and under B. \$165,000,000, or a total of \$365,000,000.

**II. Expansion of Hospital Facilities.** The Committee found hospital facilities inadequate and recommends a ten year program providing for expansion of the nation's hospital facilities by provision of 360,000 beds, and by construction of 500 health and diagnostic centers. Averaged over a ten year period the total cost of such a program was estimated at \$146,000,000.

**III. Medical Care for the Medically Needy.** The Committee finds that, based on a National Health Survey, one-third of the population which is in the lower income levels is receiving inadequate general medical service. This applies to (1) persons without income supported by general relief; (2) those supported through old age assistance or work relief, and (3) families with small incomes. Current provisions to assist these people by any local and voluntary organizations and by physicians are not equal to meet the need. The Committee recommends that the Federal government, through grants-in-aid to the states, implement the provision of public medical care to these groups. It is estimated that on the average ten dollars per person annually would be required to meet the minimum needs for essential medical care, hospitalization, and emergency dentistry. This part of the program would probably reach an estimated level of \$400,000,000 annually.

No statement was made as to how this money was to be spent, nor to whom it would go.

**IV and V** include a general program for medical care and insurance against loss of wages during sickness. The Committee states that without great increase in the total national expenditure the burden of sickness cost can be greatly reduced, through appropriate devices to distribute these costs among groups of people and over periods of time. The cost of the insurance and allied program has been estimated at approximately \$2,600,000,000 annually.

To finance the program, two sources of funds could be drawn on: (a) general taxation or special tax assessment; (b) specific insurance contributions. The Committee recommends consideration of both methods.

**Cost: 30 Billions**

The role of the Federal Government would be principally that of giving financial and technical aid to the states in the development of procedures largely of their own choice. The maximum annual cost to Federal, State and local governments of all recommendations, other than the insurance features, is estimated at about \$850,000,000. Over a period of ten years this would mean \$8,500,000,000. If compulsory health insurance is added to this at an estimated annual expenditure of \$2,600,000,000, the ten year expenditure for this and the other program would amount to more than thirty billion dollars.

The manner in which the inspired health reformers referred, without batting an eye, to the expenditure of billions was most impressive. If the government is actually called on to meet these demands, it will make the cost of old age and unemployment insurance look like a mere side issue. No doubt the alleged lack of business ability and financial sense in the medico accounts for his inability to disregard, in like manner, the stupendous sums involved.

**Some Are of Value**

Although it would be impossible to make a detailed review of these proposals in these columns, their comparative value may be summed up as follows: some of the recommendations are well founded and should prove to be of benefit to public health; others are either unnecessary or are not practical; and the rest would do more harm than good. Many features of those recommendations which are largely of a preventive nature will meet with approval by the medical profession, provided that the program can be carried out in close coöperation with and under the control of medical organizations.

**Would Alter Medical Practice**

Many of the recommendations which would alter if not transform the practice of medicine require careful study and investigation before they can be endorsed by the medical profession. Outstanding among these proposals may be mentioned the establishment of at least 500 health centers throughout the land for the control of tuberculosis, cancer and other lesions, and several thousand centers for the control of child health. These centers will, in order to be com-

plete, necessarily require the services of a host of physicians in various capacities as specialists, technicians, and administrative officers, which, together with allied dental, nursing and technical services, will lead to complete modification of the present methods of medical practice.

*It would be quite impossible for any nationwide plan of this kind to escape eventual lay and political control, with leveling and deterioration of service, not to mention professional regimentation and suppression of individual professional initiative.*

**Based on WPA Figures**

Most of the information and recommendations made in the Report of the Technical Committee and most of the statements made by the three introductory speakers on the program regarding the incidence of illness and lack of medical care were based on statistics obtained from the National Health Survey. This survey was made largely by WPA workers over a period of six months under the supervision of the Public Health Service. The resulting statistics are based on a house to house canvass of 740,000 urban and 36,000 rural families. Much of the reported illness and type of disease had no medical confirmation. The fact that the diagnosis and evaluation of reported disease was made without medical training would in itself make the survey of doubtful value.

A review of the survey reveals many other data which might be questionable. For example, statements made by persons on relief or with low incomes as to disease being the cause of their economic status may be biased. The frequency and severity of illness reported by this survey so greatly exceeds that reported by the Committee on Cost of Medical Care and that of the Metropolitan Life Insurance Company, and differs widely in so many other respects with these surveys, that the accuracy of the entire report is open to question.

**Open to Question**

Many broad conclusions were made from the survey statistics which are open to question, such as the statement that 40 per cent of the persons canvassed were receiving too low an income to maintain them in a healthy condition. This certainly is not true in most sections of the country—and even if it were true the problems involved are more economic than medical. The situation would be changed very little by

giving this group more medical care without correcting the economic factors.

The statistics purporting to show the percentage of individuals who receive no medical care are not even probable, furthermore. Most similar studies have shown that about 50 per cent of the population suffer no illness requiring medical care during any given year. The statistics in regard to relative need and distribution of hospitals in relation to the population have been proved to be quite erroneous by the careful survey carried out under the supervision of the Council on Medical Education and Hospitals. These are random examples but they show how statistics can be made to fit preconceived ideas and used to prove them.

#### Said Dr. Goldwater

Space will not permit a detailed review of the discussion which followed the reading of the various sections of the Committee Report. I have already indicated the general tenor of the remarks of those who took part. Among those few who discussed the problems from a more conservative angle was Dr. Goldwater of New York City and his remarks deserve special consideration. Unfortunately, space permits only a few quotations from his address, which are as follows:

"The objectives stated by spokesmen for the Inter-departmental Committee are commendable, but the program submitted arrives at its results by methods of calculation that are too simple to be reliable. Neglected illness is not always convertible by means of money grants or administrative measures into illness effectively prevented or cared for. A substantial fraction of increased government expenditure is almost certain to be used for more custodial care."

"Sincere enthusiasts who, thirty years ago, were sure that tuberculosis would be abolished by 1935, are still writing optimistic tuberculosis programs in glamorous terms of hundreds of fresh millions of dollars."

#### Self-help Preferable

"In health-protection, self-help is preferable to outside aid; government intervention in medicine is desirable as a last, not a first, resort."

"For similar reasons the efforts of county medical societies and of medical cooperatives sponsored by ethical physicians should be encouraged. These efforts are of primary importance in relation to home care, which is of concern to a greater number of individuals than actual or theoretically required institutional care."

"Medical care should be locally, rather than nationally, administered. The effective and economical administration of medical aid for the masses by huge Federal agencies is well nigh impossible."

The vigorous defense by Dr. Fishbein of the methods employed by the American Medical Association and organized medicine, ex-cathedra and also in the abbreviated time allotted him for discussion, should be mentioned. Also among those who contributed from the conservative side Dr. McCormack should be mentioned and Dr. Paullin, Father Schwitalla, Dr. Veeder, and Dr. Meyer.

In the summing up of the evidence for the plaintiffs by E. E. Witte, Professor of Economics, University of Wisconsin, the liberal cohorts were urged to press their cause even more than in the past. He pointed out that in order to obtain real progress action by the separate states would be necessary. He predicted that the honor of being the first state to support a health insurance law would probably go to New York, but that the immediate opportunities in Wisconsin appeared most promising. It would seem that our brethren in Wisconsin will be in for a hard winter and it is up to medical organizations in the surrounding states to give them all the support, both moral and actual, that we can muster.

W. F. BRAASCH, M.D.

#### FRONT PAGE ATTENTION

Reverberations from the National Health Conference had scarcely died down in the press when an investigation of the American Medical Association and its affiliate in Washington, D. C., the District of Columbia Medical Society, to determine whether or not their activities constituted a monopoly in restraint of fair competition under the anti-trust laws, claimed front page attention.

The investigation is the next step in the contest that has been going on for some time (résumé in these columns, May, 1938) between the District of Columbia Society and the Group Health Association of employees of the Federal Home Loan Corporation.

The Group Health Association was set up by a federal appropriation of \$40,000 and is operated by monthly contributions of members with a hired medical staff. Both the original grant and the method of operation have been declared illegal and unconstitutional by various authorities and, on those grounds, physicians who associated themselves with it were threatened with expulsion from the society and were denied the

privilege of taking their Group Health Association patients into the hospitals.

#### Question at Issue

The District of Columbia Medical Society is not open to the charge of lagging in the provision of medical care to low income groups in Washington. Its bureau to assist in providing care for these people and in suiting fees to their ability to pay has been in successful operation for some time. The question at issue is whether or not the federal government may step in to finance a type of medical service which encroaches on the rights of physicians and holds grave possibilities for establishing a low standard of medical care in the District of Columbia.

#### To Be Tested in the Courts

According to a recent dispatch from Washington, three prominent Washington physicians have taken legal steps to bring the issue to a head and possibly force a Supreme Court decision on the legality of the whole matter. They have asked the district court to restrain the Group Health Association from practising medicine.

The likelihood that the federal charge of monopoly in violation of the anti-trust laws can be made to stick against the American Medical Association and its affiliate is extremely doubtful.

Physicians have nothing to fear from the law. Their problem is to prevent a swing of public opinion to a general unthinking endorsement without trial of compulsory health insurance.

#### PUBLIC ASSISTANCE

Figures for May, 1938, on case loads and payments to recipients of Public Assistance indicate a steady increase in the number of recipients and in the amount of money expended for it in Minnesota.

On December 31, 1937, the case load for Old Age Assistance in Minnesota was 62,357. On May 31, 1938, the case load had risen to 64,717. On December 31, 1937, the case load for children receiving Aid to Dependent Children was 11,512 in the state. In May, 1938, it was 14,688.

The same increase is apparent throughout the

record. At the end of May there was an increase of almost 600 on WPA certification lists waiting for assignments, over the number on the waiting list at the end of April.

The *Monthly Review of Public Assistance* in the State of Minnesota issued by the State Board of Control provides complete graphs and tables showing case loads and amounts expended by counties for Old Age Assistance, Aid to Dependent Children, Aid to the Blind and certain limited data on WPA.

They should be of profound interest to physicians especially as a gauge of the welfare situation in Minnesota.

#### IF I HAD KNOWN

(Monthly Editorial Prepared by the Medical Advisory Committee)

If I had only known—. One of our members so expressed himself after a Summons and Complaint had been served on him recently in an alleged Malpractice suit.

If he had only known what? That many times your friends are the source of your most disagreeable lawsuit. You have confidentially told them of a case of yours. The news spreads. An unscrupulous lawyer hears of it. The patient is interviewed, and the story must be told in Court.

If he had only known what? That good records, not too meticulous, but covering the essential points from day to day, written, if possible, and, if dictated, read and signed by the attending physician on the case are a most necessary means of defense in Court. That these records are confidential, should never be altered, and are for the use of the doctor himself. They should be filed in such a way that only the Court can make them public property.

If he had only known what? That his fellow medical confrere down the street should be his most valued friend and that a good lawyer is a source of much peace of mind when a cloud of prejudice appears on the horizon.

If he had only known these things, your Medical Advisory Committee is sure he would have had less cause for worry.

## MEDICAL ECONOMICS

### MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

#### Chiropractor Sentenced to Four Years in Prison

State of Minnesota vs. Herman V. Feenstra. On August 10, 1938, Judge Joseph Moriarty of Shakopee sentenced Herman V. Feenstra, 65 years of age, an itinerant unlicensed



abortion and he was charged with one particular offense. His plea of guilty followed.

Feenstra stated he was born at Ackley, Iowa, and that he graduated from the Davenport School of Chiropractic in 1922. He located at Elkton, South Dakota but soon was in trouble there over abortions and lost his license. According to the clerk of court at Brookings, South Dakota, Feenstra has a conviction in that county for abortion and has been arrested for manslaughter, drunken driving and rape. The clerk stated Feenstra jumped a \$2,500 cash bond January 19, 1938, at Brookings in the rape case.

Feenstra had two grips in his car containing instruments for doing abortions. He also had a supply of Leunbach's Paste (Merz & Co., Chemical Works, Newark, New Jersey). His records indicate that he has performed hundreds of these illegal operations, charging from \$15 to \$300 per patient. Many were done in South Dakota.

Feenstra was told by Judge Moriarty, "You are a menace to society and it is the hope of this Court that you serve every day of your sentence." Splendid cooperation was given by Sheriff Beihoffer and County Attorney O'Hara of Glencoe.

#### Quack Doctor Forfeits Bail Bond of \$750 at Owatonna

State of Minnesota vs. J. A. White. On Wednesday, August 3, 1938, Judge F. A. Alexander of the Municipal Court at Owatonna ordered the bail bond of J. A. White forfeited because of



White's failure to appear in court for a preliminary hearing following White's arrest for practicing healing without a basic science certificate. The defendant had posted the bond, signed by Ralph Brown and August Briese of Owatonna, on July 26th. Mr. Brown is a local agent for the Metropolitan Life Insurance Company and Mr. Briese

is a farmer. The Court's order means that the bondsmen will have to pay Steeple County \$750.

White was arrested July 24 at Ladysmith, Wisconsin, following a joint investigation of his activities by Mr. Brist for the Minnesota State Board of Medical Examiners, Sheriff E. T. Helgeson of Steele county,

and Mr. A. B. Anderson and Mr. Charles Stones, county attorney and assistant county attorney, respectively, of Steele county. White waived extradition and was returned to Owatonna, where he was released on the bond furnished by Mr. Brown and Mr. Briese.

White came to Steele county in the latter part of March, this year, driving a Packard car with Georgia license plates. Because of a bad snowstorm White asked for shelter at the home of farmers a few miles west of Owatonna. He represented himself as "Professor" White and also as "Dr." White; he claimed to be a psycho-analyst and in a few days was diagnosing ailments and suggesting pills, tablets, capsules, etc. He charged from \$6.00 to \$40.00 per patient. The medicine was purchased by White at drugstores in Owatonna for a mere fraction of the amount he charged.

Sheriff Helgeson sent White's fingerprints to the Federal Bureau of Investigation at Washington and was promptly advised that White was wanted at Jesup, Georgia, for swindling and practicing medicine without a license. White, in the meantime, had secured his release at Owatonna on bond and started for parts unknown. White also had been arrested in Detroit, Michigan, in 1918 on a charge of "larceny by trick." White claims to have been born in 1858 but appears to be sixty to sixty-five years of age; he is accompanied by Mrs. White. Judge Alexander issued a bench warrant for White's arrest and it is hoped that he will be apprehended somewhere.

The Medical Board wishes specifically to mention the splendid work done by Sheriff Helgeson and Mr. Anderson and his assistant, Mr. Stone; quackery cannot exist in a county where public officials give the whole-hearted cooperation and timely effort that was given in this case.

#### PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

MAY 13, 1938

#### April Examination

Ahl, Carl Willard, U. of Minn., M.B. 1937, Minneapolis, Minn.  
Ansprenger, Aloys Georg, U. of Munich, M.D. 1933, Rochester, Minn.  
Berman, Abe E., U. of Minn., M.B. 1937, Minneapolis, Minn.  
Brown, Hugh Osborne, Northwestern U., M.D. 1937, Rochester, Minn.  
Burkhart, Roger John, U. of Minn., M.B. 1938, Chaska, Minn.  
Campbell, Donald Clarence, U. of Neb., M.D. 1935, Rochester, Minn.  
Chalek, Jack I., U. of Minn., M.B. 1937, St. Paul, Minn.  
Cochrane, Ray Fleming, U. of Minn., M.B. 1937; M.D. 1937, Minneapolis, Minn.  
Colyer, George Edward, U. of Ill., M.D. 1936, Rochester, Minn.  
Cronin, Thomas Dillon, U. of Texas, M.D. 1932, Rochester, Minn.  
Darling, John Pendleton, Rush Med. Col., M.D. 1937, Rochester, Minn.  
Doehring, Paul Christoph, Jr., Rush Med. Col., M.D. 1937, Rochester, Minn.  
East, John, U. of Okla., M.D. 1937, St. Paul, Minn.  
Feinstein, Julius Yale, U. of Minn., M.B. and M.D. 1937, Minot, N. Dak.  
Fischer, Verrill John, Rush Med. Col., M.D. 1937, St. Paul, Minn.  
Flink, Edmund Berney, U. of Minn., M.B. 1937, Minneapolis, Minn.  
Gordon, Martin Norton, U. of Minn., M.B. 1937, Minneapolis, Minn.  
Gorman, William Ambrose, Western Reserve, M.D. 1932, Duluth, Minn.  
Greene, Laurence Francis, Harvard U., M.D. 1936, Rochester, Minn.

## MEDICAL ECONOMICS

Hauge, Erling Trygve, U. of Minn., M.B. 1937, Clarkfield, Minn.

Hoffbauer, Frederick William, U. of Minn., M.B. and M.D. 1937, Minneapolis, Minn.

Hollinshead, William Henry, Jr., U. of Minn., M.B. 1937, Minneapolis, Minn.

Holmstrom, Emil Gustave, U. of Minn., M.B. 1937, Minneapolis, Minn.

Holzapfel, Fred C., U. of Minn., M.B. 1937, Minneapolis, Minn.

Hudec, Elwyn R., U. of Minn., M.B. 1937, Silver Lake, Minn.

Hughes, Bernard J., U. of Minn., M.B. 1937, Duluth, Minn.

Jones, Herbert William, Jr., Harvard U., M.D. 1937, Minneapolis, Minn.

Katzovitz, Hyman, U. of Minn., M.B. 1937, St. Paul, Minn.

Kendrick, Marvin Hayne, Harvard U., M.D. 1935, Rochester, Minn.

Kershner, Calvin Myles, U. of Pa., M.D. 1936, Rochester, Minn.

Knutson, Lewis Arthur, U. of Minn., M.B. 1937, Minneapolis, Minn.

Kremen, Arnold James, U. of Minn., M.B. 1937, Minneapolis, Minn.

Lannin, Bernard G., U. of Minn., M.B. 1937, Mabel Minn.

Leary, William Vincent, U. of Minn., M.B. 1937, St. Paul, Minn.

Leitschuh, Linus Frederick, U. of Minn., M.B. 1937; M.D. 1938, Minneapolis, Minn.

Mavrelis, William Peter, U. of Minn., M.B. 1936; M.D. 1937, Chicago, Ill.

McCullough, John Andrew Lawson, U. of Toronto, M.D. 1934, Rochester, Minn.

McKean, Frank Flanders, U. of Minn., M.B. 1938, Minneapolis, Minn.

Merrill, Robert William, U. of Minn., M.B. 1937, Starbuck, Minn.

Mickelson, John Charles, U. of Minn., M.B. 1938, Mankato, Minn.

Moren, Leslie Arthur, U. of Minn., M.B. 1937, St. Paul, Minn.

Moss, Arthur James, U. of Minn., M.B. 1937, Minneapolis, Minn.

Munn, Elizabeth L., U. of Ore., M.D. 1936, Rochester, Minn.

Murphy, James Edward, U. of Minn., M.B. 1937, Minneapolis, Minn.

Nesheim, Martin Otto, U. of Iowa, M.D. 1937, Duluth, Minn.

O'Brien, John Patrick, Jefferson Med. Col., M.D. 1935, Rochester, Minn.

Overpeck, Darrell O., Indiana U., M.D. 1934, Rochester, Minn.

Parson, Edwin Irvine, U. of Minn., M.B. 1937, Duluth, Minn.

Pastore, Pietro Nicolino, Med. Col. of Va., M.D. 1934, Rochester, Minn.

Plotke, Harry Louis, U. of Minn., M.B. 1937, St. Paul, Minn.

Pollock, George Angus, U. of Glasgow, M.B. and Ch.B. 1923, Rochester, Minn.

Rein, Gerald Norman, U. of Mich., M.D. 1933, Rochester, Minn.

Roberts, Lewis Joshua, U. of Minn., M.B. 1937, St. Paul, Minn.

Robertson, Frank O., U. of Ore., M.D. 1937, St. Paul, Minn.

Ross, Alexander Joseph, U. of Minn., M.B. 1937, Minneapolis, Minn.

Rousseau, Maurice Cyprian, U. of Minn., M.B. 1937, St. Paul, Minn.

Rudin, Harry N., U. of Minn., M.B. 1938, Minneapolis, Minn.

Schroder, John Richard, U. of Minn., M.B. 1938, Duluth, Minn.

Schweiger, Lamont R., Rush Med. Col., M.D. 1937, Rochester, Minn.

Sherman, Alfred Gustav, U. of Minn., M.B. 1938, Minneapolis, Minn.

Simonson, Donald Bennett, Rush Med. Col., M.D. 1937, Minneapolis, Minn.

Squire, Everett Wayne, Rush Med. Col., M.D. 1937, Rochester, Minn.

Strassmann, Erwin Otto, Friedrich-Wilhelms U., M.D. 1922, Rochester, Minn.

Tingdale, Carlyle, U. of Minn., M.B. 1937; M.D. 1938, Minneapolis, Minn.

Tudor, Robert Bruce, U. of Minn., M.B. 1937, Minneapolis, Minn.

Uihlein, Alfred, Jr., Johns Hopkins U., M.D. 1935, Rochester, Minn.

Welte, Edwin Joseph, U. of Minn., M.B. 1937, Minneapolis, Minn.

Will, Charles Bishop, U. of Minn., M.B. 1938, Duluth, Minn.

### By Reciprocity

Elliott, William, Rush Med. Col., M.D. 1927, Virginia, Minn.

Laney, Howard John, U. of Wis., M.D. 1935, Prescott, Wis.

Lipp, Frank Edward, Creighton U., M.D. 1934, Appleton, Minn.

Thompson, Harlow B., U. of Ore., M.D. 1935, Park Rapids, Minn.

### National Board Credentials

Morrison, Charlotte Jean, U. of Minn., M.B. 1933; M.D. 1934, Minneapolis, Minn.

Neff, Walter Scott, Jefferson Med. Col., M.D. 1932, Virginia, Minn.

Schmitt, George Fredrick, Jr., U. of Maryland, M.D. 1935, Rochester, Minn.

## PHYSICIANS LICENSED JULY 16, 1938

### June Examination

Anderson, Robert Edward, U. of Minn., M.B. 1935, Minneapolis, Minn.

Arey, James Blanding, U. of Minn., M.B. 1937, Ex-celsior, Minn.

Arko, Joseph Lawrence, U. of Minn., M.B. 1938, Chisholm, Minn.

Bjorn, Carl Ludvig, U. of Minn., M.B. 1938, Jackson, Minn.

Borowicz, Leonard Ambrose, U. of Minn., M.B. 1938, Strandquist, Minn.

Breslow, Lester, U. of Minn., M.B. 1938, Staten Island, N. Y.

Buehler, Martin Stowell, U. of Minn., M.B. 1938, Minneapolis, Minn.

Cameron, John Hugh, McGill U., M.D. 1937, Bagley, Minn.

Ceplecha, Stanley Francis, Marquette U., M.D. 1938, New Prague, Minn.

Childs, Theron Baker, Northwestern U., M.D. 1938, Duluth, Minn.

Clarke, William O., U. of Minn., M.B. 1937; M.D. 1938, Hibbing, Minn.

Cohen, Ephraim Bernard, U. of Minn., M.B. 1938, Minneapolis, Minn.

Condon, William B., McGill U., M.D. 1933, Rochester, Minn.

Danstrom, John Richard, Northwestern U., M.D. 1938, Duluth, Minn.

Demo, Robert Anthony, U. of Minn., M.B. 1938, Blue Earth, Minn.

Farkas, John Victor, U. of Minn., M.B. 1938, St. Paul, Minn.

Frank, Harold Joseph, U. of Minn., M.B. 1938, New Prague, Minn.

Freedland, Morris, U. of Minn., M.B. 1938, Minneapolis, Minn.

## OF GENERAL INTEREST

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Furst, John N., U. of Minn., M.B. 1938, Minneapolis, Minn.  
Gaviser, David, U. of Minn., M.B. 1937, Minneapolis, Minn.  
Guloen, Hans Edward, Rush Med. Col., M.D. 1938, Fargo, N. Dak.  
Heersema, Philip Henry, U. of Pa., M.D. 1935, Rochester, Minn.  
Hiebert, Homer L., U. of Kans., M.D. 1937, Topeka, Kansas.  
Hoffmann, Heinz Otto Edward, Rush Med. Col., M.D. 1937, Rochester, Minn.  
Jeromimus, Henry Jergen, Jr., U. of Minn., M.B. 1938, Minneapolis, Minn.  
Kabler, Paul Wesley, U. of Minn., M.B. 1938, University Campus, Minneapolis, Minn.  
Karleen, Conrad Immanuel, U. of Minn., M.B. 1938, St. Louis, Mo.  
Karon, Irvine Millard, U. of Minn., M.B. 1937, St. Paul, Minn.  
Katz, Robert A., U. of Minn., M.B. 1938, Minneapolis, Minn.  
Killins, Jack Adrian, U. of Nebr., M.D. 1937, St. Paul, Minn.  
Krieger, Albert Edward, Loyola U., M.D. 1938, Mankato, Minn.  
Kurtin, Henry John, Marquette U., M.D. 1938, Lonsdale, Minn.  
Leffel, James Monahan, Jr., Indiana U., M.D. 1935, Rochester, Minn.  
Lockwood, William Wayne, U. of Ill., M.D. 1936, Rochester, Minn.  
MacKenzie, Duncan Stuart, Jr., U. of Minn., M.B. 1936; M.D. 1937, Havre, Mont.  
Meyer, Jules Owens, U. of Minn., M.B. 1937, St. Paul, Minn.  
Nichols, Donald Richardson, U. of Minn., M.B. 1937, Minneapolis, Minn.  
Papermaster, Theodore C., U. of Minn., M.B. 1938, St. Cloud, Minn.  
Paulson, Elmer Clarence, U. of Minn., M.B. 1937, Fergus Falls, Minn.  
Pfuetze, Karl Hamilton, U. of Kans., M.D. 1934, Nopeming, Minn.  
Ravits, Everett Cyrus, U. of Minn., M.B. 1938, St. Paul, Minn.  
Redding, Marion Diet, Tulane U., M.D. 1934, Rochester, Minn.  
Seidenstein, Howard Robert, U. of Minn., M.B. 1938, New Rochelle, N. Y.  
Shepard, Virgil Duncan, U. of Mich., M.D. 1936, Rochester, Minn.  
Terrell, Bernard Joseph, Ohio State U., M.D. 1932, Nopeming, Minn.  
Tracht, Robert Russell, Loyola U., M.D. 1932, Minneapolis, Minn.  
Wilson, John Francis, Jefferson, M.D. 1937, Minneapolis, Minn.  
Wolsztajn, Symcha-David, U. of Paris, M.D. 1935, Minneapolis, Minn.

### By Reciprocity

Garthe, John Joseph, Loyola U., M.D., 1936, Shakopee, Minn.  
Haller, William Morgan, Jr., U. of Neb., M.D. 1933, Cass Lake, Minn.  
Hanson, Harold Birger, Rush Med. Col., M.D. 1930, St. Paul, Minn.  
Harrison, Malcolm Wilbur, Tulane U., M.D. 1930, Rochester, Minn.  
Movius, Arthur James, Jr., Northwestern, M.B. 1936; M.D. 1937, Rochester, Minn.  
Raetz, Sylvester Joseph, Marquette U., M.D. 1937, Watkins, Minn.

### National Board Credentials

Wipperman, Frederic Francis, U. of Minn., M.B. 1937; M.D. 1938, Minneapolis, Minn.

SEPTEMBER, 1938

## OF GENERAL INTEREST

Dr. E. I. Parson, who has just completed his internship at St. Luke's Hospital in Duluth, has located in Askov for the practice of medicine.

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Dr. Dwight Martin, son of Dr. and Mrs. T. P. Martin of Arlington, was married recently to Miss Evelyn Kienitz of Saint Paul. Dr. and Mrs. Martin will make their home in Saint Paul.

\* \* \*

Dr. George T. Ayres of Ely was elected president of the Vermilion Range Old Settlers' Association at the twenty-fourth annual reunion of the group, held at Eveleth in July.

\* \* \*

Dr. Duane Olson of Gaylord was recently married to Miss Lyndis Iverslie of Delano. Dr. Olson is associated with his father, Dr. Duane O. C. Olson, in the practice of medicine at Gaylord.

\* \* \*

Dr. W. G. Benjamin, of Pipestone, has recently been selected as a new member of the board of education at Pipestone. Dr. Benjamin is also president of the Pipestone Civic and Commerce Association.

\* \* \*

Dr. C. E. Anderson, who has practiced medicine in Brainerd for the past thirteen years, has gone to Great Falls, Montana, where he will continue his medical practice. Dr. Anderson has disposed of his practice in Brainerd to Dr. W. E. Fitzsimmons of Saint Paul.

\* \* \*

Dr. R. A. Glabe has become associated with Dr. J. A. Slocumb of Plainview for the practice of medicine. Dr. Glabe, who obtained his medical degree at the University of Minnesota, recently completed his internship at St. Luke's Hospital in Duluth.

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Dr. Robert D. Mussey of Rochester is Vice Chairman of the Executive Committee and Chairman of the Educational and Scientific Exhibit Committee of the American Congress on Obstetrics and Gynecology, which is to be held in Cleveland, Ohio, in 1939.

\* \* \*

Dr. T. J. Bloedel has become affiliated with the Bratrud Clinic at Thief River Falls, where his work will be limited to internal medicine, diagnosis and treatment. Dr. Bloedel graduated from the University of Minnesota, and served his internship at the Minneapolis General Hospital.

\* \* \*

Dr. S. D. Wolstan has become associated with Dr. Oscar Daignault, of Benson, in the practice of medicine. Dr. Wolstan is a graduate of the Faculty of Medicine of the University of Paris. He served his internship at St. Louis Hospital in Paris and at the Swedish Hospital in Minneapolis.

## ◆ REPORTS and ANNOUNCEMENTS ◆

### MEDICAL BROADCAST FOR SEPTEMBER

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 9:45 o'clock every Saturday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

*Speaker:* William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota. The program for the month will be as follows:

- September 3—Premature Care
- September 10—Birth Marks
- September 17—Tularemia
- September 24—School Dentistry.

### INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION

The International Assembly of the Interstate Postgraduate Medical Association of North America will be held in the Public Auditorium of Philadelphia, October 31, November 1, 2, 3 and 4, 1938. The Assembly will be preceded and followed by clinics in the various Philadelphia hospitals.

This well known medical meeting aims to present the newer developments in medicine and surgery with particular emphasis on their practical use from a clinical standpoint. The five-day program, which will occupy morning, afternoon and evening, except for Wednesday evening, which will be devoted to the annual banquet, will be presented, for the most part, by professors from medical schools of the United States and Canada. One European guest speaker appears on the program, Professor Dr. V. Eicken of the Medical Faculty of the University of Berlin, whose subject will be "Osteomyelitis of the Frontal Bone."

Philadelphia, with its wealth of clinical material, fine hospitals and excellent hotel accommodations, offers an ideal city for the Assembly meeting. The Philadelphia County Medical Society, the Pennsylvania State Medical Association, the College of Physicians of Philadelphia, and the Philadelphia Chamber of Commerce, will all coöperate to make the Assembly a success.

A cordial invitation is extended to all physicians in good standing in their state and provincial associations. Physicians are urged to bring their ladies, for whom an excellent program has been arranged. Philadelphia holds many places of historic interest which will make a visit to Philadelphia particularly attractive.

Attention is called to the list of distinguished Assembly speakers, which appears on page xxi of the advertising section of this issue.

Registration fee is \$5.00.

This year's officers of the Association are: Dr. El-

liott P. Joslin, President, Boston; Dr. George W. Crile, Chairman of Program Committee, Cleveland, and Dr. William B. Peck, Managing Director, Freeport, Illinois.

### MEDICAL CORPS OF THE U. S. NAVY

Graduates of Class A medical schools between twenty-one and thirty-two years of age are eligible to take the examinations which will begin November 7, 1938. Applications should be filed at least one month prior to that date. Successful candidates will be commissioned as Assistant Surgeons with the rank of Lieutenant (junior grade) and assigned to the Naval Medical School, Washington, D. C., for a postgraduate course of instruction. Upon completion of the internship competitive examinations will be held for permanent appointment, the right to return to civilian practice being retained. The rank of Lieutenant affords compensation of \$2,699 per year for those without dependents and \$3,158 for those with dependents. Applicants must be American citizens.

For further information address the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

### MILITARY TRAINING FOR MEDICAL RESERVISTS

The tenth annual training course for Medical Department Reservists (Inactive Status) of the Army and Navy will be held at the Mayo Foundation, Rochester, Minnesota, October 3-15, 1938.

Special clinical and hospital work will be given mornings and subjects in military medicine morning, afternoon and evening.

The program for the last three days will be merged with that of the Association of Military Surgeons of the United States. Surgeons General of the Army, the Navy and the Public Health Service will attend and participate.

All Medical Department Reservists are eligible for enrollment. Applications should be made to the Headquarters of the Seventh Corps Area, Omaha, Nebraska.

### GRADUATE FORTNIGHT OF THE NEW YORK ACAMEDY OF MEDICINE

The eleventh annual Graduate Fortnight will be held this year from October 24 to November 4, 1938. The program consists of daily afternoon clinics at the various New York hospitals, evening lectures at the Academy headquarters, and scientific exhibits. The profession is invited and a registration fee of \$3.00 admits bearer to all three groups of

## IN MEMORIAM

meetings. For further details those interested should communicate with Dr. Mahlon Ashford, The New York Academy of Medicine, 2 East 103rd Street, New York City.

### MISSISSIPPI VALLEY MEDICAL SOCIETY

The fourth annual meeting of the Society, which includes in its membership physicians of Illinois, Missouri and Iowa, will be held at Hannibal, Missouri, September 28 to 30, 1938.

The program will consist of over fifty lectures, clinics, short courses and round table discussions. An All-Chicago program will occupy the first day of the meeting with a Stag Buffet Supper in the evening. A banquet and entertainment will be held the second evening. Dr. I. C. Brill, Assistant Professor of Medicine at the University of Oregon Medical School, winner of the Prize Essay Contest, will read his winning essay on Failure of the Circulation; Types and Treatment.

Physicians are cordially invited to attend. Harold Swanberg, M.D., 209 W.C.U. Building, Quincy, Illinois, is secretary.

### CENTER FOR CONTINUATION STUDY

The Center for Continuation Study announces a fall program of six postgraduate medical courses. The subjects are Proctology, September 19 to 24, Diseases of Genito-urinary Tract, September 19 to 24, Diseases of Infancy and Childhood, September 26 to October 1, General Medicine, October 10 to 15, Diseases of the Skin, October 31 to November 5, and Tuberculosis, November 14 to 19.

The tuition for each course will be \$25.00. Registration may be made by sending in a registration fee of \$3.00, which will apply on the tuition. The enrolment in the course in Proctology is closed.

Physicians will find it to their advantage to live at the Center for Continuation Study, where delightful accommodations will be found. Members of physicians' families may accompany them and stay at the Center for the same living rates.

Physicians planning on attending the home football games with the Universities of Washington, Nebraska, Michigan, and Iowa which will take place during the medical programs should make their ticket applications directly to the Football Ticket Office, 108 Cooke Hall, University of Minnesota, Minneapolis.

As in the past, the faculties will be recruited from the staff of the Medical School, Mayo Foundation, and members of the Minnesota State Medical Association. In addition, distinguished clinicians from other centers will lead discussions. Among others Dr. Curtice Rosser, Professor of Proctology, Baylor University, Dallas, Texas; Dr. Hobart A. Reimann, Magee Professor of Practice of Medicine and Clinical Medicine, Jefferson Medical College, Philadelphia, Pennsylvania; Dr. Lloyd G. Lewis, member of the Urology Staff of Johns Hopkins Hospital, will appear on the programs.

Physicians planning to attend should make their reservations early as enrolment in each course is limited.

SEPTEMBER, 1938

### CENTRAL ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS

The annual meeting of the Central Association of Obstetricians and Gynecologists will take place in Minneapolis, October 6-7-8, Radisson Hotel. Dr. J. C. Litzenberg will be the honored speaker. All physicians are invited to attend as guests.

### HOECOMING CLINIC OF MEDICAL ALUMNI

The Minnesota Medical Alumni Association will hold its annual business meeting at a luncheon at the University Hospital on Friday, October 14. This is the day preceding the Homecoming game with Michigan. The president of the Association, Dr. Robert L. Wilder of Minneapolis, has appointed Dr. Harold G. Benjamin as chairman of the program committee for the clinical presentations at the hospital on Friday morning. The details of this program will be announced at a later date.

## In Memoriam

### W. P. Ross

1893-1938

D R. W. P. ROSS died suddenly of a heart condition in his home at Ottertail County Sanatorium, Battle Lake, Minnesota, on June 25, 1938.

Dr. Ross was a Canadian by birth, having been born in Woodstock, Ontario, 1893. He became a citizen of the United States in the summer of 1937. He moved with his parents to Saskatchewan when a boy and obtained his preliminary education in that province. His medical education was obtained in the Manitoba Medical College, Winnipeg, where he graduated in 1923. His internship was obtained in one of the hospitals of Winnipeg. He was in general practice at Brandon, Manitoba, several years, following which he served as one of the assistant physicians at Ninnette Sanatorium, Ninnette, Canada.

Dr. Ross came to Minnesota in December, 1929, as assistant physician at the Southwestern Minnesota Sanatorium, Worthington. He held the position until November, 1937, when he resigned to take over the duties of Superintendent and Medical Director of the Ottertail County Sanatorium, Battle Lake, Minnesota. This position he was holding at the time of his death.

He was faithful to his duties and held high the ideals of his profession. The past ten years of his life were devoted to tuberculosis work, a phase of medicine in which he was intensively interested and to which he contributed much of value. He was a member of the Minnesota Sanatorium Association and the Minnesota State Medical Association.

He was married to Rita Brooks of Winnipeg on August 11, 1926. She, together with two sons, William and James, survives him.

## BOOK REVIEWS

### BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

**THE VITAMINS AND THEIR CLINICAL APPLICATIONS.** Prof. Dr. W. Stepp, Doz. Dr. Kühnau and Dr. H. S. Schroeder, University of Munich. Translated by Herman A. H. Bouman, M.D., Minneapolis. 173 pages. Price, cloth, \$4.50. Milwaukee: Vitamin Products Co., 1938.

**OUTLINE OF ROENTGEN DIAGNOSIS.** Leo C. Rigler, B.S., M.B., M.D. Professor of Radiology, University of Minnesota, Minneapolis. 212 pages of text. 254 illustrations. Price, student's edition without illustrations, paper cover, \$3.00; complete edition, cloth, \$6.50. Philadelphia: J. B. Lippincott Co., 1938.

**THE HORSE AND BUGGY DOCTOR.** Arthur E. Hertzler, M.D., of Halstead, Kansas. 322 pages. Illus. Price, cloth, \$2.75. New York: Harper & Bros., 1938.

**THE TECHNIQUE OF CONTRACEPTION.** Fourth Edition. Eric M. Matsner, M.D., 50 pages. Illus. New York: National Medical Council on Birth Control, 1938.

**THE STORY OF LUCKY STRIKE.** Roy C. Flannagan, Staff Commentator of the Richmond News Leader, Richmond, Va., 71 pages. Illus. 1938.

**THE ROCKEFELLER FOUNDATION, ANNUAL REPORT 1937.** 506 pages. Illus. Paper cover. New York: The Rockefeller Foundation, 1938.

**CANCER—WITH SPECIAL REFERENCE TO CANCER OF THE BREAST.** R. J. Behan, M.D., Dr. Med. (Berlin), F.A.C.S. Cofounder and formerly Director Cancer Department of the Pittsburgh Skin and Cancer Foundation, Pittsburgh. 844 pages. Illus. Price, cloth, \$10.00. St. Louis: C. V. Mosby Co., 1938.

**ZUR ENTDECKUNG DER INSULINSCHOCKTHERAPIE BEI AKUTEN GEISTESKRANKHEITEN, INSbesondere BEI DER SCHIZOPHRENIE.** Dr. Julius Schuster, Gewesener I. Assistant der Pazmany Peter-Universität Psychiatrisch Neurologischen Universitätsklinik in Budapest. 90 pages. Paper cover. Budapest: Druckerei der Pester Lloyd-Gesellschaft, 1938.

**THE MANAGEMENT OF FRACTURES, DISLOCATIONS, AND SPRAINS.** John Albert Key, B.S., M.D., and H. Earle Conwell, M.D., F.A.C.S. Second edition, 1246 pages, illustrated. St. Louis: C. B. Mosby Co., 1937.

This book is one of the best and most complete, as well as concise descriptions of the principles, general aspects, diagnosis and treatment of specific injuries of the skeletal system that one could desire.

The chapter dealing with general considerations of fracture equipment desirable for any general hospital treating fractures is excellent. The authors are to be commended upon their inclusion of a chapter relating to first aid in fracture and automobile injuries, and also for their clear discussion concerning workmen's compensation laws affecting fracture cases and medical-legal aspects of fracture cases.

Discussion concerning diagnosis and treatment of injuries to specific portions of the skeletal system are clear, concise and complete. Illustrations are profuse and adequate. The index is complete and well or-

ganized. The book is practical in its entirety, relatively devoid of extraneous material, and should be a very useful tool to the medical profession.

C. H. MEAD, M.D.

**DISABILITY EVALUATION; PRINCIPLES OF TREATMENT OF COMPENSABLE INJURIES.** Earl D. McBride, M.D. Octave of 623 pages, illustrated. Cloth \$8.00. Philadelphia: J. B. Lippincott Company, 1936.

This book is valuable in pointing out the factors that should be considered before an estimate of disability in industrial cases is to be made. The author suggests what he terms a functional measuring rod, composed of one hundred units. On this rod he assigns values to the factor of function in the following way: delayed action—10%; awkwardness—20%; weakness—20%; insecurity—10%; diminished endurance—20%; lowered safety factor—10%, and averse influence of conspicuous impairment. He states that many examiners may not agree with him on the relative values of the factors concerned. His functional measuring rod suggests the consideration of factors of function often overlooked in making estimates.

The author presents a good synopsis of the Workmen's Compensation Laws in operation in the United States. The chapter on "Industrial Back" is very interesting and instructive.

R. M. BURNS, M.D.

### SUPPURATIVE PAROTITIS AS A COMPLICATION OF MUMPS

(Continued from page 649)

two centimeters long, was made just through the skin, along the lines of the natural skin folds at the angle of the jaw. The underlying tissues were then separated by blunt dissection. About forty cubic centimeters of greenish-yellow pus was evacuated, which showed pure *staphylococcus aureus* on culture. Two days later there appeared below the incision, in the region of the submaxillary gland, another fluctuant area which was emptied by blunt dissection through the previous incision. After a convalescence, uneventful except for the profuse drainage, the patient was discharged in about ten days. When seen one month later there was complete closure of the operative wound, with a normally functioning parotid gland, and all the symptoms had disappeared, including the trismus.

#### Conclusion

An unusual case is presented of suppurative parotitis complicating epidemic mumps, with spontaneous discharge into the external auditory canal.

#### Bibliography

1. Alexander, G.: Mumps mit Abszessbildung und Spondardurchbruch in den Aussen Gehörgang. *Monatschr. f. Ohrenh.*, 61:785. (July) 1927.
2. Bader, George: Acute suppurative parotitis with rupture into the external auditory canal, occurring as a complication of mumps. *Jour. Am. Med. Assn.*, 97:929-31.
3. Berndt, A. L., Buck, R., and Buxton, R.: The pathogenesis of acute suppurative parotitis. *Am. Jour. Med. Sci.*, 182:639. (Nov.) 1931.
4. Bernstein, S. R.: Mumps mit Abszessbildung und Spondardurchbruch in den Aussen Gehörgang. *Monatschr. f. Ohrenh.*, 62:212. (Feb.) 1928.
5. Lewis, Geo. V.: Acute suppurative parotitis. *Jour. Ark. Med. Soc.*, 25:58. (Aug.) 1928.

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